BUREAU OF LAND MANAGEMENT
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DOLORES RIVER ARCHEOLOGY:
CANYON ADAPTATIONS AS SEEN THROUGH SURVEY

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HENRY WOLCOTT TOLL III

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ARCHAEOLOGY

DOLORES RIVER ARCHAEOLOGY:

Canyon Adaptations as Seen Through Survey

by

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B.A., Brown University, 1971

Colorado State Office
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FOREWORD

The Wild and Scenic Rivers Act was amended by Public Law 93-621, signed by President Ford on January 3, 1975. Among the 28 rivers addressed in P.L. 93-621, the Dolores River in southwestern Colorado was singled out for accelerated study.

In the course of each study under the Wild and Scenic Rivers Act and its amendments, cultural resources within the designated river corridor must be inventoried and evaluated coextensively with all other resources.

The Dolores River Survey was completed in 1975 by contract to the University of Colorado. The survey was under the direction of Dr. David A. Breternitz and the final report was prepared by Mr. H. Wolcott Toll.

It is my hope that this professional report will result in a keener awareness by the public of the importance of our non-renewable cultural resources in every phase of land and riparian management.

I am pleased to present this publication, the fourth in our cultural resource series, of the Bureau of Land Management.

Dale R. Andrus

DALE R. ANDRUS
State Director
Colorado
Bureau of Land Management

ABSTRACT

The Dolores River of southwestern Colorado traverses a variety of ecological zones, presenting prehistoric inhabitants with a variety of subsistence possibilities and resources. In addition to crossing ecological zones, different archaeological zones are encountered. In traditional terms three archaeological cultures may be seen: the Anasazi, the Fremont, and the Uncompahgre Complex or Archaic.

Data from archaeological survey conducted in 1975 of a portion of the Dolores Canyon is presented and used as a basis for discussion of archaeology on the river. Three main kinds of data are presented: site information which indicates that a substantial portion of the sites may be other than living sites; artifact data, the artifacts being almost all lithic and indicative mainly of hunting and gathering; and rock art, which shows similarity to the greater Southwest with some elements present purported to be more culturally specific. Chronological control is minimal, but a long range, fairly stable use of the section of river under discussion is apparent.

A general similarity of tool kits and site location strategy is noted, as is the appropriateness of canyons for hunting and gathering. On the basis of this finding it is proposed that the cultural adaptations present be considered more continuous than discrete. In this regard the concept of a technocomplex with some regional variation conditioned by environmental possibilities is thought useful.

The surveys and other work show the Dolores to have considerable archaeological potential and, fittingly, more questions are raised than answered.

ACKNOWLEDGMENTS

I have a great deal for which to thank Dr. David Breternitz: for giving me my first job in archaeology (on the Dolores River) as well as a number of other jobs (several also involving the Dolores); for acting as my advisor and reading this in rough form and providing for its finishing; for helping me along the graduate school path. The BLM, through Dave Breternitz, has been a frequent employer for which I am also grateful.

The material and moral support provided by my parents and grandparents throughout my educational "career" (the time dimensions of which would frustrate normal patience) is unparalleled and deeply appreciated. Henry W. Toll, Jr.'s long involvement with the Dolores and repeated loan of equipment are largely responsible for my ever becoming associated with the river.

Cory Breternitz and my sister Ellen Toll combined to make the field work even more enjoyable than usual, in spite of the best efforts of superheated gravel terraces. Cory was also kind enough to read a draft of the report; between that and discussions in the field, many of the ideas in what follows are at least partly his.

The members of my thesis committee, Drs. Payson Sheets and Joseph Lischka, were patient and kind enough to read the thesis version of this report and make useful suggestions which are largely responsible for any improvement of the present version over the former. Thanks are also due Paul Nickens and George Simmons for taking the time to review and comment on all or part of the text.

Peter Gleichman, Marci Donaldson, and Christine Robinson all participated in the processing of artifacts, site forms, and reports. Kellie Masterson volunteered her expertise in several areas of analysis, filling large gaps left by my ignorance. Penny Kokora's cheerful, fast, and efficient typing from less than wonderful copy made that phase painless (for me).

Lastly, mil gracias a nuestra Senora de Dolores y su Rio for many beautiful days, good jobs, and good archaeology. May you and your river both remain unsullied.

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INTRODUCTION

The Dolores River in southwestern Colorado (Figs. 1-4) has of late become of increasing public and governmental interest. Though dams have been proposed for the river for many years, the current planning for the Bureau of Reclamation's Dolores River, centering on the proposed McPhee Dam, seems to be the most serious project thus far. The proposed damming, the explosion in outdoor recreation (especially white water boating) and recent environmental concern and legislation have produced a number of studies (BOR-NFS 1975 among others) and a good deal of controversy.

Among the studies engendered are a number of archaeological surveys conducted by the University of Colorado Mesa Verde Research Center under Dr. David Breternitz. This paper had its beginnings as the cover report for a survey conducted for the Bureau of Land Management in the summer of 1975 (Contract No. 14-11-0008-3159, renewal). As it was felt that enough had been done archaeologically to warrant a somewhat broader treatment of Dolores River archaeology than a single season survey report, a somewhat more extensive synthesis was attempted. The result has been three slightly different versions of the same basic report: the original, designed to accompany the 61 site reports of the 1975 survey; a version prepared to stand without the site reports, used as a Master's thesis at the University of Colorado; and the present rendition, a modified (and hopefully clarified) version of the thesis.

Reconnaissance and inventory (coverage varied according to conditions discussed in the following section) was conducted primarily from June 18 to July 8, 1975.

This main phase was done by boat by Ellen Toll, Cory Breternitz, and the author. The latter returned to some portions accessible by road in September.

One of the more salient features of the Dolores from any aspect is the diversity of terrain it traverses. Archaeological coverage of the whole river is nowhere near complete, and discussion of all that has been done is far beyond the scope of this undertaking. Therefore, the data and area of the 1975 survey had been used as the core of the discussion with some supplementation from other work. In effect, the main Anasazi horticultural area of the river becomes "marginal" (a novel switch) to the center of discussion and the archaeologically unknown upper portions of the river above the town of Dolores are ignored. The 1975 survey in combination with earlier surveys (Breternitz and Martin 1973; Breternitz 1971; 1972; Toll 1974) gives a fairly complete cross-section of the archaeology of the Dolores below the town of Dolores.

Documentation on artifacts has been included in Appendices A, B, and C in hopes of disencumbering the text but still providing the data. These appendices are, despite their position, an important supplement to the cursory discussion of artifacts. Sketches of all the rock art recorded in 1975 are also presented in hopes that they too may be of use.

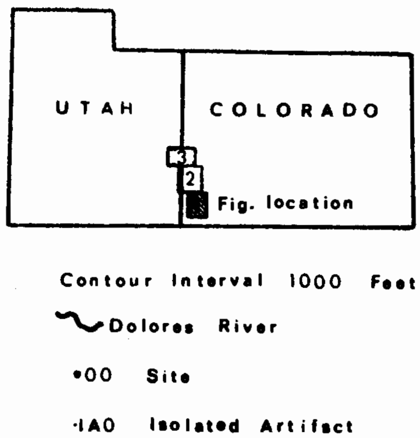
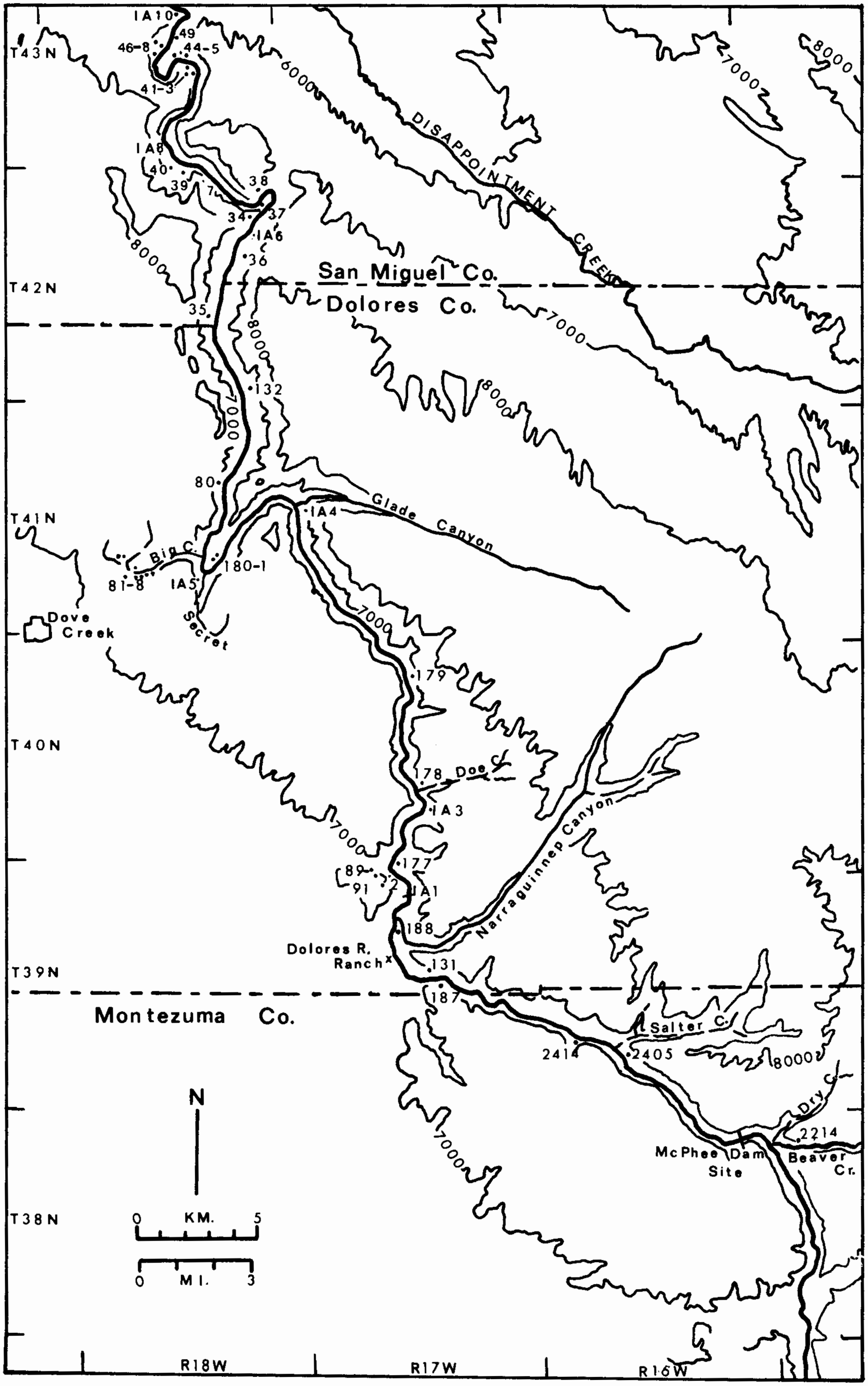


Figure 1. Map of the Dolores River, southern section. This section includes the open, Anasazi part of the canyon on either side of the dam site; the deep narrow "Ponderosa Gorge" from Narraguinnep Canyon to about 5SM36, and an area with many overhangs near the Disappointment pointment Valley. Only sites mentioned for their rock art are shown in the uppermost part (surveyed in 1972-1974). All sites recorded by the Mesa Verde Research Center downstream from the Dolores River Ranch are shown. Sites in Montezuma County are prefixed "5MT", in Dolores County "5DL", and "5SM" in San Miguel County. Matches with Figure 2.


San Miguel Co.
Dolores Co.
Montezuma Co.
DISAPPOINTMENT CREEK
Glade Canyon
Big C.
Secret
Dove Creek
Doe C.
Narraguinnep Canyon
Dolores R. Ranch
Salter C.
Dry C.
McPhee Dam Site
Beaver Cr.
T43N
T42N
T41N
T40N
T39N
T38N
R18W
R17W
R16W
N
KM.
MI.

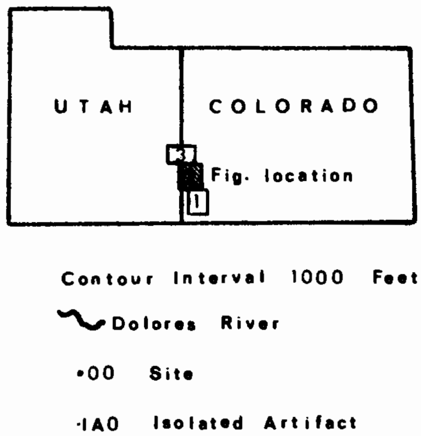
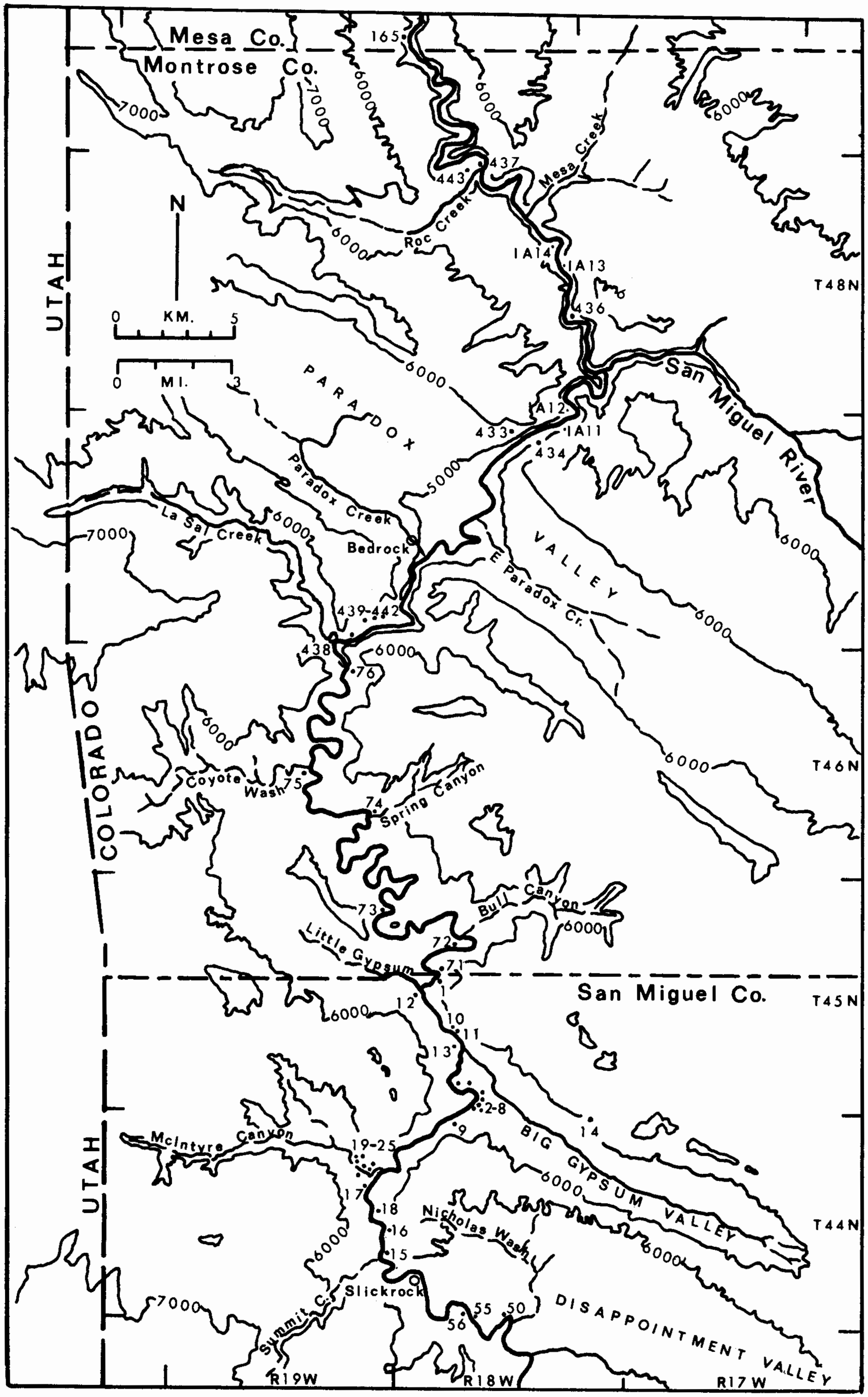


Figure 2. Map of the Dolores River, middle section. Two main canyons are shown: the "Serpentine Canyon" from Little Gypsum Valley to La Sal Creek and the canyon downstream from the Paradox Valley. Note the paucity of sites in the Serpentine Canyon and the clusters of sites at side canyon confluences. Sites in San Miguel County are prefixed "5SM", in Montrose County "5MN", and in Mesa County "5ME". Matches with Figs. 1 and 3.


Mesa Co.
Montrose Co.
San Miguel Co.
UTAH
COLORADO
N
0 KM. 5
0 MI. 3
PARADOX
VALLEY
BIG GYPSUM VALLEY
DISAPPOINTMENT VALLEY
San Miguel River
Mesa Creek
Roc Creek
Paradox Creek
E. Paradox Cr.
La Sal Creek
Bedrock
Coyote Wash
Spring Canyon
Bull Canyon
Little Gypsum
McIntyre Canyon
Nicholas Wash
Summit C.
Slickrock
T48N
T46N
T45N
T44N
R19W
R18W
R17W

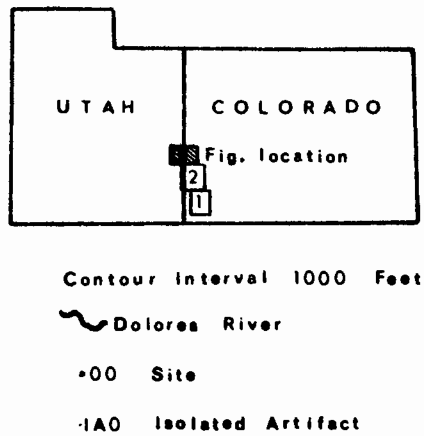
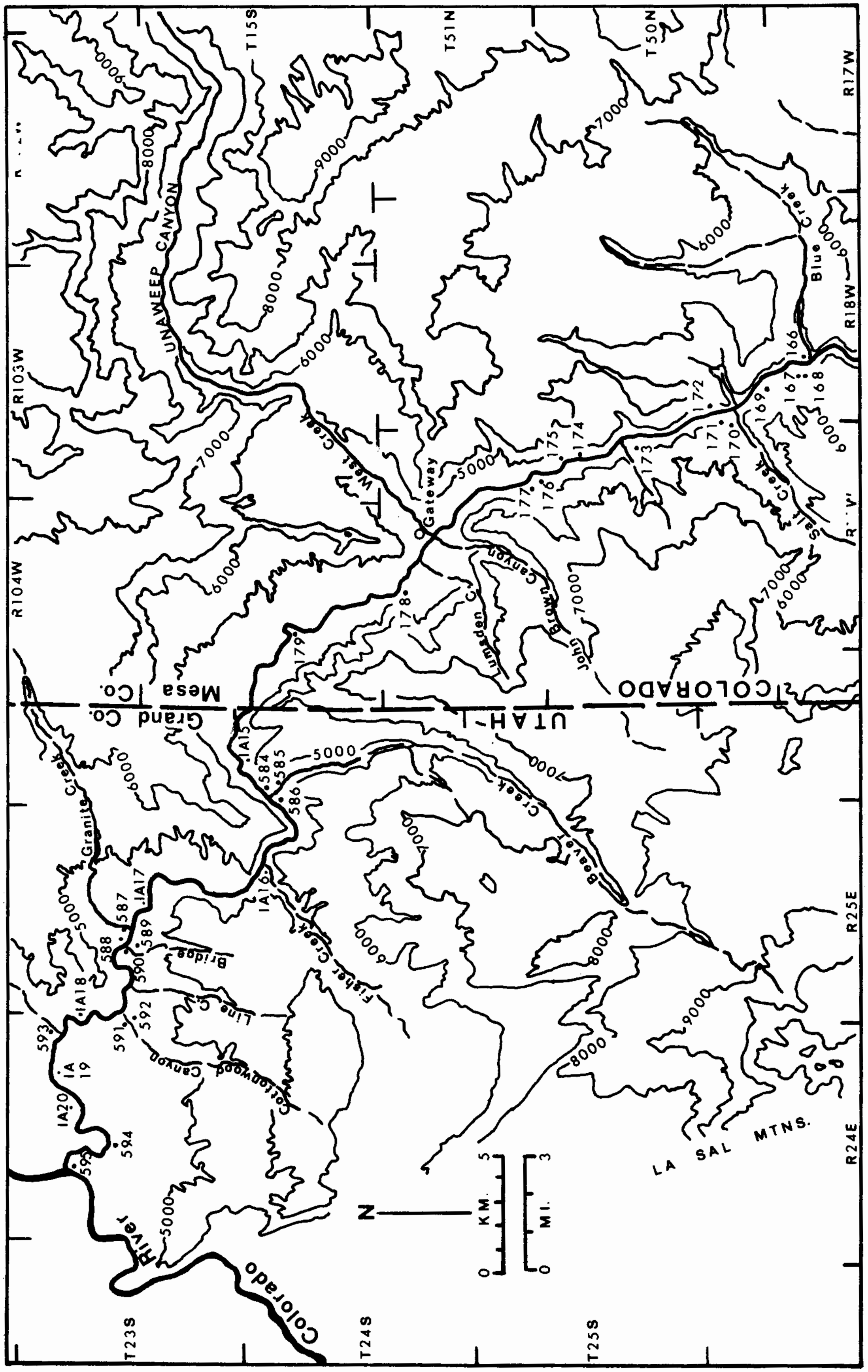


Figure 3. Map of the Dolores River, northern section. The end of the canyon above Gateway, the open area around Gateway, and the last canyon from the state line to the confluence with the Colorado are shown. Again note the concentration of sites around the confluences with side canyons. Also noteworthy is the great diversity of elevation. Site numbers in Mesa County begin with "5ME"; those in Grand County are prefixed "42GR". Matches with Fig. 2. In contrast to the vertical orientation of Figs. 1 and 2 this figure is oriented horizontally (i.e., long dimension is east-west).


UNAWEEP CANYON
West Creek
Gateway
Blue Creek
Salt Creek
Lumsden C.
Canyon
John Brown
Mesa Co.
Grand Co.
COLORADO
UTAH
Beaver Creek
Granite Creek
Fisher Creek
Bridge
Line C.
Cottonwood Canyon
Colorado River
LA SAL MTNS.
KM.
MI.
N
R103W
R104W
R18W
R17W
R25E
R24E
T15S
T51N
T50N
T23S
T24S
T25S
5000
6000
7000
8000
9000

1975 SURVEY METHOD AND ASSESSMENT OF COVERAGE

The method of survey and the contractual reason for doing the survey have an inevitable effect on the survey's results and should be briefly examined. As river travel impact was the main concern of the BLM, our approach from the river made a great deal of sense. In addition, river travel is the only practical access to several stretches of the canyon. Visibility of potential site areas is sometimes limited from the river, but compensation for such limitation was made through continuous reference to United States Geological Survey (USGS) quadrangles (1:24,000 scale were available for all but the lowest section, primarily Utah) and the fact that a great deal of time was spent on foot, well above the river bottom. Intensive survey of the approximately 120 miles (195 km.) of unsurveyed canyon was of course not possible with the allotted time and manpower. Thus, a balance of coverage had to be reached from these considerations: (1) areas likely to be visited by river runners; (2) archaeologically likely areas; (3) accessible areas (much the same as (1)); and (4) the demands of time and limited personnel. In some portions of the canyon survey clearance was possible from the boats; such areas consist of steep, uninterrupted talus and cliffs from canyon rim to floor, which are readily ruled out by considerations 1 and 2. When a landform in a section consistently was found to be lacking sites, some areas were not walked, but only when many similar features had been examined. These non-productive features were also occasionally spot-checked as we progressed down the river and when they looked to have greater site potential, as when they were more accessible by foot travel, had large boulders associated, were flatter, or more prominent. Examples of this sort of landform are the extensive boulder fields at the talus base-terrace edge along much of Colorado 141 between the Roc Creek Confluence and the Salt Creek Confluence, and the numerous gravel terraces from below the state line to the confluence with the Colorado River. Probably the most difficult decisions arose when the topography provided no obvious limits to the distance it was possible to go above and away from the river. This is a problem especially in the vicinity of Disappointment Valley, Paradox Valley, and Gateway, but also occasionally where the canyon is quite wide.

While the coverage is thus not intensive and does rely to a degree on the subjective decisions of the surveyors, I personally feel the following assessment of the coverage accomplished is an honest one.

In terms of river travel impact, all areas highly likely to be visited were checked. As mentioned above, a great deal of time was spent on foot--it is very <u>un</u>likely that recreational boaters would visit many places not surveyed. A possible exception to this is extended hikes up side canyons (see below), though most of the Dolores' side canyons preclude this activity anyway. Archaeologically speaking, it is possible that a high percentage of sites visible from the surface near the river have been recorded (except in the areas noted below). The entire canyon, once again, can by no means be considered completely surveyed, but the coverage is sufficient to give a reasonable picture of the cultural and site variety found within approximately 300 vertical feet of the river (a zone often extended to the canyon rim by sheer cliffs and very steep talus).

Unsurveyed Areas

Best intentions to the contrary, coverage of the unsurveyed portion of the river was not completed. Areas not yet surveyed in any way are as follows:

The vicinity of Disappointment Valley. In T.43N, R.18W, Sections 10, 3, 4, and 5 contain extensive areas of rolling hills and gravel terraces that rise gradually from the southwest side of the river; north and east of the river the canyon is low and the Disappointment Valley is beyond. The barrenness of this area make river travel impact improbable. There are however, probably some sites in this area. An impressive site, 5SM50, is near the river in one of the few overhangs in the vicinity. Sites 5SM55 and 5SM56, at the edge of the unsurveyed stretch, show further that the area was used prehistorically. Unsurveyed terraces south of the river continue in T.44N, R.18W, Section 32 to where the river enters the canyon just above Slickrock. Little or nothing is known of Disappointment Valley archaeology, exploration of which would be a large project unto itself; the Dolores end of such a study would be very important.

Between La Sal Creek and Bedrock. G. and E. Woodbury (1932:13-16) state that no sites aside from that reported here as 5MN439 are present in this stretch. Sites 5MN76, 5MN438, 440, 441, and 442 show this not to be the case. Further unsurveyed potential site areas are present south of the river and east of 5MN442 in T.47N, R.13W, Section 36, T.47N, R.18W, Section 31 contains a large basin and a number of terraces with potential and many areas in Sections 30 and 19 should also be examined. This area in general is of added importance because of its proximity to the Paradox Valley.

Paradox Valley. The west end of the Paradox has long been known to contain a number of interesting sites (Woodburys 1932) which may probably be attributed to the Fremont Culture. We did no survey in the valley for several reasons. The valley around the river is very flat and the flood plain large making surface detection of sites improbable; there is a good deal of cultivated land; some disturbance is present in the form of salt ponds; it was our understanding that Fort Lewis College was to survey the valley for the Bureau of Reclamation. This last assumption proved to be only partially true in that the Fort Lewis survey only included a transmission line along the highway in East Paradox, from Bedrock to Dry Creek Basin. The survey located a number of non-structural, non-ceramic sites within the right of way. (Dr. Susan Applegarth, personal communication). The presence of sites in East Paradox and in the canyon above Bedrock point up the Woodburys' (1932) heavy orientation toward structural sites and the incomplete nature of their survey. The Woodburys dismiss East Paradox Valley as a "desert" which "...produced not the slightest sign of archaeological material (1932:5, 12). Archaeologically the Paradox Valley is very important to the understanding of the largely unknown eastern edge of the Fremont Area and its interface with the mountainous region further east. For immediate purposes, recreation on the Dolores should have little effect on the archaeology of the Paradox, though its high accessibility by road endangers it considerably.

San Miguel Confluence. In T.48N, R.18W, Sections 25 and 24 east of the Dolores there is a high terrace which extends up the San Miguel canyon. Along the cliff base of the San Miguel portion a number of sites were found (Breternitz, Newsom and Toll 1973). The Dolores portion of the terrace is unsurveyed, but it is inaccessible from the river. A similar feature begins on the west side of the river in Section 23 and extends through Section 14 to Section 11. The entire west side is accessible by roads from the bridge in Section 11, the east side from Colorado 141. This area contains Dolores Cave, excavated by C.T. Hurst (1947). Hurst's (1947:9) published location of NE¼ of NE¼, Section 14 is clearly wrong as it places the site on the east side of the river. The site is likely to be in the W½ of the NW¼ of Section 14 or in the NE¼ or NE¼ of Section 15. Very sparse material was present on the lowest terrace inside the hairpin bend of the river (I.A. 14) but no surveying was done in Section 14 on the west side of the river. The cliff base east of the river and Highway 141 in Sections 14 and 11 and to the north and east in 11 and 10 were not checked. The latter area is fenced and irrigated. The river travel impact potential in all of these areas is low, though the archaeological potential and that of other impact is fairly high.

Gateway Basin. From about two miles above the town of Gateway to the Utah state line around seven miles below the town, the canyon is very wide and contains many huge terraces and benches. Fairly extensive checking on the south and west side of the river produced only sites 5ME178 and 179, both sparse sites. Less extensive walking of the other side revealed nothing. Once again river travel is likely to have almost no impact in this area. As will be discussed below, confluences of permanent streams such as West Creek are important foci of prehistoric activity. The town of Gateway has created widespread disturbance of West Creek's confluence with the Dolores; the area is also mostly privately owned. This confluence was thus not surveyed and should not be impacted by recreation; it does however seem likely to have had and have sites associated with it. The series of prominences on the north and east side of the river above Gateway are quite high above the river and appear to be largely exposed bedrock--these features were not walked.

In addition to the above areas, the following side canyons have not been surveyed and may attract hikers from the river:

Narraguinnep Canyon. Sites are known on the mesa top (Ward-Williams 1975b); the area is accessible by road as well.

Summit Canyon. This canyon is quite long; it is thought by Bolton (1950:30-33:143-145) to be Escalante's return route to the river. Escalante observed recent signs of Utes in the vicinity and his guides saw Utes at Disappointment Creek when in the area on an excursion prior to the Escalante expedition.

McIntyre Canyon. A number of sites were found at the mouth of this canyon (Breternitz 1972) and it continues for some distance (2-3 miles) to be wide and flat-bottomed.

Big Gypsum Valley. Some survey was conducted around the Dolores in Big Gypsum in 1971 (Breternitz 1971). Eleven sites were found at the Dolores end alone and a twelfth recorded in Hamm Canyon. While sites might be expected to be concentrated near the river, further examination of the valley seems warranted.

Little Gypsum Valley. Little Gypsum was also checked around its mouth in 1971 (Breternitz 1971); two sites were found. It is a very extensive feature which could have been used for access to higher ground.

Bull Canyon (the upper of the two Bull Canyons entering the Dolores). The canyon is shown as containing springs and expanding greatly four to five kilometers from the river on the quad. It looks archaeologically promising where it widens. River travel impact seems potentially minor; some roads do enter the canyon from the east.

Coyote Wash. Though checked quite extensively without result in 1972 (Breternitz 1972) Coyote Wash is another long drainage. The site at its mouth contained one Tusayan Corrugated sherd.

La Sal Creek. A sizable, permanent, fresh water stream, La Sal Creek Canyon is known to contain a stone circle site (Woodburys 1932:13-14) and petroglyphs (Jeancon 1926). Sites from near its mouth further suggest its potential importance.

Red Canyon. As noted for the San Miguel Confluence many sites are known in this area. The Radium Trail follows Red Canyon. The canyon is not especially evident from the river.

Mesa Creek. Being a complex drainage, Mesa Creek provides a variety of potential access to many areas. Dry in June and September it is shown as perennial on the 1:24,000 Red Canyon Quad. Especially the mouth offers site potential, but is mostly private, and has been cultivated.

Roc Creek. Dr. Vondraček of Metro State College spent some time excavating a structural site in Roc Creek Canyon in 1974 (5MN367). This drainage is an excellent candidate for providing information on the "Fremont Culture" as seen in the Paradox Valley (see Rock Art discussion, Figs. 23-30, Cultural discussions).

Blue Creek. Mr. Ames, who lives at the mouth of Blue Creek knows of sites up Blue Creek one of which he says includes a trail, another, pictographs. Several prehistoric manifestations are at the mouth of this permanent stream.

Salt Creek. Unlikely to contain sites because of the sheerness of the canyon; a road runs the length of the canyon. Some material is present in the Sinbad

Valley. Mr. Proctor of Paradox has heard of a structural site in a canyon wall somewhere on Sewemup Mesa, but he had no locational information. Sewemup Mesa is riven with canyons and is at present completely uninhabited.

Maverick Canyon. This was walked but not surveyed. No material was observed nor were potential site locations below Juanita Arch. The vicinity of Juanita Arch should be more thoroughly examined as it is an attraction for visitors.

Cave Canyon. Cave Canyon is not a long canyon, and the cave was not seen, but the name is suggestive of a potential site. Sites 5ME176 and 5ME177 are at its mouth, but the large gravel terrace between the sites and the talus was found to contain no material.

West Creek--Unaweep Canyon. Highway 141 runs through Unaweep Canyon and Gateway is at its mouth both causing much disturbance and easy access. West Creek is a permanent stream and the canyon provides access to the Uncompahgre Plateau as well as to the Delta-Grand Junction area. Locals mention Ute use of the canyon, and Huscher (1939) reports that there are many sites there, citing Unaweep as an important prehistoric travel route. The Alva and Taylor sites (Wormington and Lister 1956) are at the opposite end of the canyon from the Dolores.

John Brown and Lumsden Canyons. Both of these canyons enter the Dolores Canyon opposite West Creek. Each is sizable and conceivably of prehistoric importance. John Brown Canyon contains a road.

Beaver Creek, Utah. Beaver Creek drains a very extensive area; its head is over 10,000 feet in elevation in the La Sal Mountains. The permanence, size, apparent traversibility, and obvious ecological diversity of Beaver Creek make it seem likely to have seen much prehistoric use. Only the immediate vicinity of Beaver Creek's confluence with the Dolores was surveyed; sites 42GR584-586 are located here. In contrast with surrounding areas this may be considered a high site density.

Fisher Creek--Cottonwood Canyon. Though not as extensive as Beaver Creek's, Fisher Creek's drainage also is large and rises in much higher country than its 4500 foot confluence with the Dolores. Isolated Artifact 16 was the only evidence of use of Fisher Creek, but again only the mouth was checked.

Granite Creek. Yet another stream draining a large area, this one on the north side of the river. Granite Creek is shown variously as permanent and intermittent; much of its canyon is narrow and quite profound. Its head is at around 8,000 feet on Pinyon Mesa; ten to 15 kilometers to the northeast of the head of Granite Creek are the Glade Park sites reported by Wormington and Lister (1956:93-126). Sites 42GR587 and 42GR588 are located at the mouth of Granite Creek; nothing else was surveyed.

Bridge Canyon. This canyon appears to be largely exposed bedrock, but sites 42GR589-590 are situated at its mouth.

Line Canyon. The Shuras, who live at the nearby ranch, have taken basketry and other perishables as well as much other cultural material from a cave in Line Canyon.

Cottonwood Canyon (lowermost of three draining to the Dolores). This canyon also has the potential of having overhang sites--42GR591 is in such a feature where the canyon opens onto the floodplain of the Dolores. The Canyon is divergent and contains several roads.

Historic Site Coverage

The final qualification to be made on the scope of the survey is that no historic (Anglo) sites were recorded unless they were in association with prehistoric or aboriginal remains. Historic sites are present to a limited extent along the river and a listing of observed historic items is presented in Appendix D. Though Fray Escalante travelled along portions of the Dolores between the present Dolores townsite and Big Gypsum Valley in 1776 (Bolton 1950), most Anglo evidences are unlikely to date earlier than the 1880's when the final removal of the Utes was effected (Brüyn 1955:79-80). Mining interests have been the primary attraction of the Dolores to modern man and most historic structures and other manifestations are the result thereof. Agriculture and ranching have been and are practiced in the vicinity of the Dolores River Ranch, Disappointment Creek, Big Gypsum, Paradox, Roc Creek, Blue Creek to Gateway, Sheep and Beaver Creeks, and the Utah Bottoms.

RESUMÉ OF ARCHAEOLOGICAL WORK ALONG THE DOLORES RIVER

Archaeological sites on the Dolores River were among the first to be reported in Colorado. Escalante mentions several signs of Indian occupancy of varying age within the Dolores drainage in his journal of 1776, among them the Escalante Ruin (Bolton 1950:141-149). In spite of the early recognition of prehistoric remains, research--in strict opposition to the more prevalent vandalism--has until recently been quite spotty near the river. For reasons noted in the introduction, there has been a great intensification of archaeological work since 1971.

Table 1 and Figure 4 present an overview of all known research projects that are directly associated with the Dolores River or figure heavily in the discussion. Not shown is the relatively much greater amount of work concerning Anasazi structural sites at Mesa Verde and in the bean and canyon country south and southwest of the area covered by Figure 4. Buckles' (1971) and Wormington and Lister's (1956) work, both often cited, took place to the northeast of the map.

TABLE 1

Archaeological Work on the Dolores River

Fig. 4 Key	Project	Reference	Location	Findings
1	Mancos-Dolores Highway Salvage Excavations	Biggs *et al* in preparation	South of the Dolores, southeast of the town of Dolores, on State Highway 184 right of way.	5 habitation sites with large, deep pit-houses and associated surface structures. Most are late Pueblo I, with some early PI manifestations. Tree ring dates are in the A.D. 830's.
2	House Creek Timber Sale Survey	Zier and Robinson 1975	Uplands east of the Dolores, northwest of the town of Dolores. From Beaver Creek to Bean Canyon.	Ten sites consisting mostly of lithic material, but with some Anasazi pottery. Low site density and large number of isolated artifacts suggest use of area for hunting, apparently through long time period.
3	Escalante Ruin Excavation	Breternitz 1975 Nemetz, n.d.	West of the town of Dolores, overlooking the Big Bend; on the south rim of the river valley.	PII-PIII site with Chaco-style kiva and other Chaco traits, much trade pottery and unusual quantities of obsidian for the area. Dates in the A.D. 1130's by dendrochronology.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
	Dolores River Project--1972-3 Survey	Breternitz and Martin 1973	Proposed McPhee Reservoir pool, small reservoirs near Pleasant View and Dove Creek, Ruin Canyon, and connecting canals.	Substantial Anasazi occupation of the river valley including two large PI sites; rolling area west of McPhee townsite also heavily used. Most of the sites within the dam pool are PII or earlier. Site density, especially of later sites, increases around heads of canyons draining to McElmo Creek and the San Juan River.
4	Dolores River Project--1974 Survey	Kane 1975a	Canal lines, pipe lines, and proposed reservoirs between Dove Creek and Highway 147. (West of the Dolores.)	Earlier sites (BMIII-PI) more abundant in higher locations (i.e., toward the river but away from the canyon rim). A shift toward the canyons to the west during PII times is indicated.

TABLE 1 (continued)

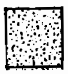
Fig. 4 Key	Project	Reference	Location	Findings
5	Dolores River Project--1975 Survey	Kane 1975b	Recreation areas and access roads north of, west of, and south of the proposed McPhee Reservoir.	North: non-structural sites consisting of lithics only and of sherds and lithics. South edge: PI-PII sites. West of the west rim: PI-PII sites including 1 large PI site with a possible great kiva (Cline Crest Ruin). Further evidence of heavy occupation west of Pleasant View.
	BLM-Dolores River Survey, 1974	Toll 1974	Within the Dolores Canyon from the proposed McPhee Dam site to the Dolores River Ranch.	Sites along the periphery of the floodplain and up the talus. Primarily PI with some non-ceramic and later manifestations.
	BLM-Dolores River Survey, 1975	this report	Dolores Canyon. 5DL187 (2.5 km above Dolores River Ranch) to the Dove Creek Pumping Station. "Ponderosa Gorge".	5DL177-181, 5DL187-188. Four of these sites had nothing but lithics associated; the other 3 have both structures and sherds. Low site density below the ranch.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
6	Ormiston Timber Sale Survey	Ward-Williams 1975b	Ormiston Point, vicinity of Narraguinnep Canyon; north and east of the river--T.39-40N, R.16W.	13 sites and numerous isolated finds. Sites occur along the rim of Narraguinnep Canyon, and in concentrations around the heads of large drainages to intermittent streams. Most collections are solely chipped stone, but 4 sites contain small numbers of sherds.
7	Dove Creek Timber Sale Survey	Ward-Williams 1975a	East of Dove Creek along the canyon rim; vicinity of Dolores Canyon overlook and south.	Mostly lithic sites with a few sherds and grinding tools present. Evidence of activity along the canyon rim for over 6 km in the form of lithics in varying density of distribution. Possibly a material source.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
8	BLM Dolores River Survey 1971	Breternitz 1971	Big Canyon and the Dolores Canyon from the Dove Creek Pumping Station to the forest boundary. ("Ponderosa Gorge".) Area of west rim below Narraguinnep Canyon.	All sites contained lithics only: 5DL80-91. One site with a wall had no material associated. High site density in Big Canyon, very few sites in main canyon.
	BLM Dolores River Survey 1974	Toll 1974	Forest boundary to river hairpin (5SM34); small rim area east of Egnar.	Sites are sparse in both areas; a few BMIII-PI and PII sherds found in the canyon.
	BLM Dolores River Survey 1975	this report	Dolores Canyon--river hairpin (5SM34) to Slickrock.	5SM34, 5SM37-50, 5SM55-56. Many overhang sites. All collections but two contain no sherds. Site occurrence quite low except where canyon begins to fall away below the Ponderosa Gorge.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
	BLM Dolores River Survey 1972	Breternitz 1972	Dolores Canyon--Slickrock to Big Gypsum Valley.	Sites in the more open portions of the canyon, with a heavy concentration at the mouth of McIntyre Canyon. All sites seem to indicate "Archaic: adaptation, though corn cobs were present at one site. (5SM15-26).
8	BLM Dolores River Survey 1971	Breternitz 1971	Big and Little Gypsum Valleys at the Dolores.	5SM1-14, 5MN71. Open and rock shelter sites. Though some of the petroglyphs are suggestive of horticulturalists, no ceramics were found. One site with 5 manos.
	BLM Dolores River Survey 1972	Breternitz 1972	Dolores Canyon--Little Gypsum Valley to La Sal Creek. "Serpentine Canyon".	5MN72-76. Site density lower here than anywhere else in the canyon. Two large overhang sites with rock art; 2 Anasazi sherds from different locations.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
	BLM Dolores River Survey 1975	this report	Dolores Canyon--La Sal Creek confluence to 2.5 km east (downstream).	5MN438-442. Several areas on the north side of the river, two with rock art. Most are located at the upper edge of a wide, raised terrace.
9	Fort Lewis College Bureau of Reclamation Survey 1975	S. Applegarth (personal communication)	Transmission line, Bedrock to Dry Creek Basin.	Non-ceramic sites on spurs along the south side of east Paradox Valley, south of Highway 90. Possibly Fremont petroglyphs in Dry Creek Canyon.
10	State Historical Society Survey and Excavation 1931	G. and E. Woodbury 1932	West Paradox Valley, various other areas within the San Miguel and Dolores drainages.	Structural sites with associated pottery ("Puebloan PI-PII") in west Paradox. Non-ceramic structural sites and other lithic sites elsewhere. Report both sheep and bison bone.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
10	Colorado College Field School 1970	Leach and Lippold 1973	Woodburys' "Mound 2" in west Paradox, one other test.	Stratified structural sites with both Fremont and Anasazi pottery. Variable structures including a pithouse assigned to Basketmaker III. Remains interpreted to represent both Fremont and Anasazi (PI-PII) occupations of considerable duration. Identifiable faunal remains predominantly sheep; also report bison bone.
11	BLM-San Miguel River Survey 1973	Breternitz, Newsom, and Toll 1973	Confluence of the San Miguel with the Dolores to 7 km northwest of Naturita.	Mostly "Archaic" sites with some instances of Pueblo pottery and one of Ute (?) pottery. A number of overhang sites near the confluence.
12	Dolores Cave Expedition Excavation	Hurst 1947	West side of the Dolores Canyon, about 5 km below the confluence with the San Miguel.	Perishable materials including rush matting, dart and arrow preshafts, a "medicine kit", wild foods, and a little corn. No ceramics are reported.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
13	Metropolitan State College Field School 1974	Vondraček site report on file with Colorado State Archaeologist 5MN367	Magic Animal Farm, Roc Creek Canyon, about 6.5 km from the Dolores.	Group of contiguous rooms with firepits. A few corrugated, gray ware, and black-on-white sherds were present. C14 date of A.D. 905$\pm$60 (UGA 926).
	BLM-Dolores River Survey 1975	this report	Dolores Canyon. From the north side of Paradox Valley to the confluence of the Dolores with the Colorado River.	5MN433-437, 5MN443, 5ME165-179, 42GR584-595. Variety of sites, all but 42GR591 non-ceramic. Density is not high, but does increase markedly at the entrances of major side drainages. Several rock art sites and sites situated under large boulders.

TABLE 1 (continued)

Fig. 4 Key	Project	Reference	Location	Findings
14	La Sal Survey 1950-1951	Hunt 1953	La Sal Mountains and flanks. Work extended as far east as the upper west Paradox Valley.	Very large number of sites over a broad area and wide range of ecological zones; considerable time depth postulated. Defines 3 zones with different site associations: canyon--frequent structures, several pottery types; pinyon-juniper--some pottery, few structures; mountain--no pottery, no structures.

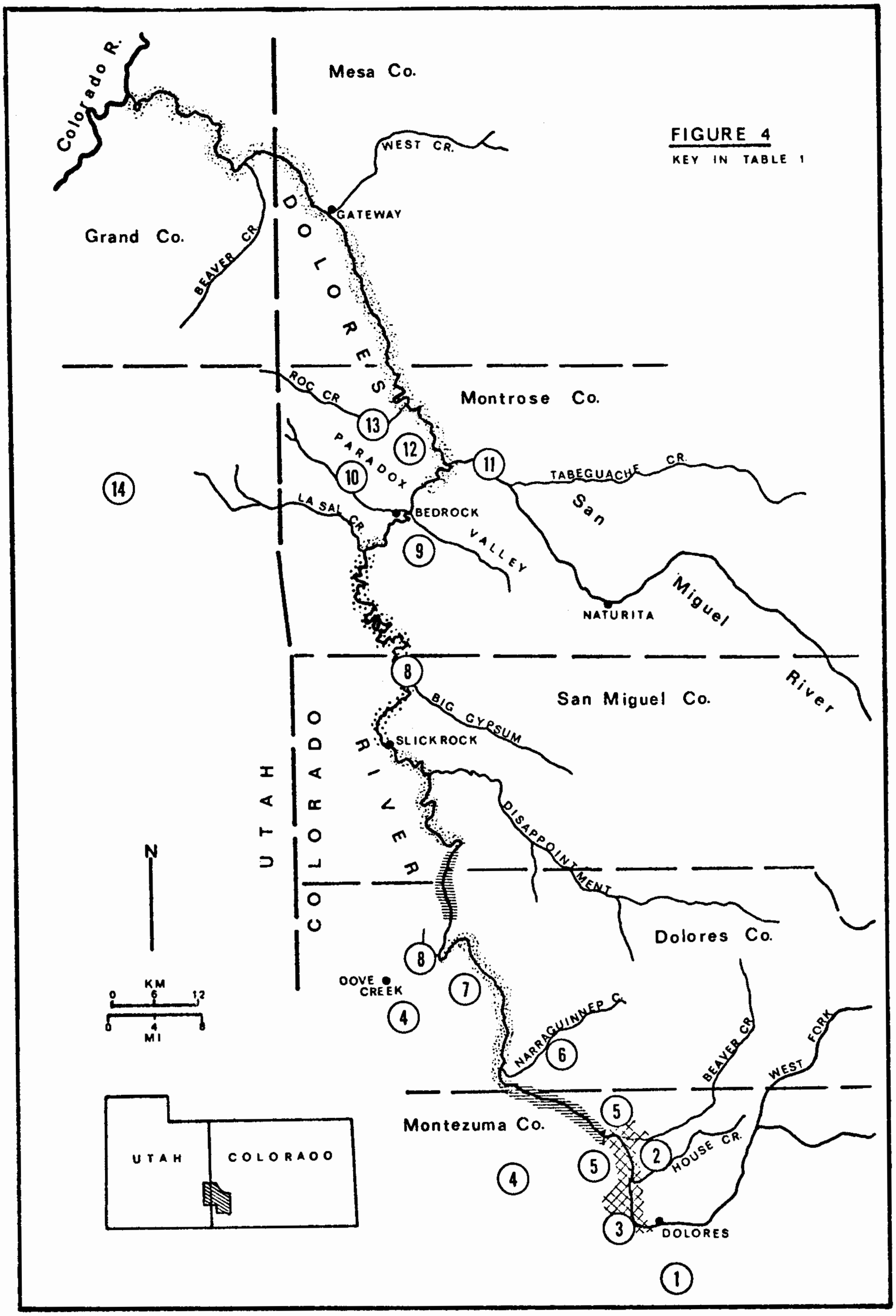


Figure 4. Map of the Dolores River showing locations of archaeological work done. Symbols are keyed in Table 1.

1975 RESULTS

Recording Procedures

The BLM's somewhat non-specific Antiquities Site Inventory form was used again in 1975. The conventions for the use of this form described in the 1974 Dolores River report and more fully in the San Miguel River report to the BLM (Toll 1974:7-8, 1975:15-18) were generally followed in this survey, with some minor modifications. A sample form illustrating our specific categories of information recorded may be seen on the following page.

Rock art was found to be quite abundant and produces its own recording problems. Probably the ideal system for recording rock art is on a 1 to 1 scale. Time and equipment did not permit this so photography and sketching had to suffice. Being of the opinion that positioning of figures relative to one another is of possible importance but lacking the freedom of large rock surfaces strict adherence to scale was not possible if figures were to be large enough to be seen in the sketches. Priorities of information recorded were, in descending order: accurate reproduction of shape, indication of relative positioning of figures, relative size of figures, and adherence to scale. Overall panel measurements and spot measurements of individual figures compensate for the lack of scale.

Site Attributes

A limited selection of attributes thought to be indicative of site use appears across the top of

Table 2. Each column head is of course subject to more than one interpretation of cultural meaning and to finer definition than presence/absence. The table is, however, useful as an index of attribute occurrence and in making low level site function interpretations.

A clarification of the columnar headings follows.

Site. While this is a basic concept it is also a difficult one to operationalize, particularly when cultural remains are diffuse or few. Barring the presence of structures (see 5ME176) or rock art (see 5ME165, 167) which sometimes have no other cultural material associated, our operational definition of a site was 10 or more reasonably localized items indicating human use of an area. Items occurring in groups of less than 10 were recorded as isolated artifacts. Most commonly such items are chipped stone but certainly include non-collectable evidence such as traces of fire. Dividing a site into areas, as was frequently done, has several advantages that outweigh the disadvantages of less indicative site counts and possible association of culturally unrelated areas. The use of extra areas naturally varies with different situations, but includes maintaining provenience of artifacts without loss of precious field time; more complete recording of marginal use areas (marginal either in the sense of extent of prehistoric use or in the sense of archaeological confidence that the area was in fact used at all); and associating spatially related activity areas. For purposes of analysis it is thought best to treat each area as an entity.

Form 6230-2
(June 1968)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ANTIQUITIES SITE INVENTORY

☐ Archeological ☐ Paleontological ☐ Historical

1. Site number	2. Type of site
Blank	Descriptive, e.g., Lithic area with mano

3. State	County	District	4. Map reference
		Montrose	USGS 7.5' and 15' Quadrangles

5. Location

Verbal description designed to aid in field relocation.
Elevation.
Vertical distance to the river. Elevational measures were left in the English system (feet) because of the use of that unit by the USGS on the quadrangles.

Section	Township	Range	Meridian
Projected if Necessary			

6. Land ownership status	7. Other site designations
	Smithsonian system number as used by Colorado & Utah State Archaeologists

8. Cultural affiliation; Geologic Age and/or formation; dates of use

Rarely assignable except in presence of pottery or structures.
Summary of material collected.

9. Site description, position, surrounding terrain, and importance

Verbal description of features and relationships including vantage, unusual resources, shelter, slope and other site topography.

Itemized specific categories of information:

Exposure:	Direction(s) to which site is most open
Vegetation:	On site In vicinity. Collection of this information was non-systematic and limited by the botanical knowledge of the personnel; emphasis placed on plants of known economic significance.
Water:	Nearest known source and distance thereto
Drainage:	In terms of drainages marked as blue line by the USGS
Soil:	Again descriptive and limited by knowledge of soils.

10. Area of occupation	11. Present condition
	Terms such as good or terrible avoided in favor of more informative descriptions.
12. Photo numbers	

13. Informants and references

14. Recorded by	Date

(continued on reverse)

15. Sketch and/or remarks

All sites sketch mapped. Scale, north arrow, contour interval, photo location, and location of material concentrations and prepared tools included.

EVALUATION

16. Does site have recreation value? ☐ Yes ☐ No If "yes," has the Recreation Inventory Form 6110–3 been completed? ☐ Yes ☐ No

17. Does site have sufficient value to justify preservation and/or development? ☐ Yes ☐ No If "yes," specify type of preservation or development.

Evaluations phrased primarily in terms of river travel and other impact expectable; "recreational" potential left largely undiscussed. Where damage (or further damage) seemed imminent, or when a site seemed to have good excavation potential mitigation or further investigation were recommended.

18. Reviewed by *(Signature of District Manager)*	Date

(1). Prepared tools. This category includes chipped stone items traditionally recognized as consciously shaped (i.e., retouched) artifacts such as projectile points, knives, or scrapers. The meaning of the presence or absence of these tools depends to a great extent on their variety at a site and their interpreted function. As they are considered activity-specific, the greater the variety the larger the number of activities inferred for the site (see, for example, Judge 1973). Reference to Appendix A will provide tool types present at each site.

(2). Grinding tools. Included here is any evidence of ground stone--hand stones (manos) or nether stones (metates, grinding slabs, etc.). The presence of these tools is taken to indicate vegetable processing, whether wild or domestic; they are often thought to thus represent more prolonged use areas.

(3). Sherds. This indicates the presence of ceramics; where possible in the table a cultural identification has been made or a Pecos Classification period assigned. Because of their scarcity on the Dolores below the Dolores River Ranch ceramics are of particular interest when they occur. Their interpretation is dependent to large extent on their context; in some cases they may be taken to be associated with horticulture, in others with trade, and others with itinerant horticulturalists using the area for non-horticultural purposes.

(4). Flat area. Even when a Brunton compass is used to measure slope on a site, it is difficult to find a figure that will characterize the slope because of changes of terrain within the site and small irregularities in the ground surface. This and the following column then, are generally eyeball estimates of the slope of what is thought to be the main portion of the site. "Flat area" may be taken to slope less than 5^{o} roughly.

(5). Sloping. Estimates of slope have been divided into two types: I--not flat, but not steeply sloped, conceivably habitable--around $5\text{-}10^{o}$; II--greater than 10^{o} slope and probably not habitable.

(6). Strcuture. Man-made prehistoric construction of stone (the only type encountered on the Dolores), indicating more permanent habitation, game blinds, defense, or even religion. Cists have also been noted under this heading; these most likely indicate storage of food or other items.

(7). Overhang. Placement of sites in overhangs is culturally important for the protection provided and archaeologically important for the preservation often afforded by such features. Included here are any form or rock shelter from large cliff overhangs to small areas underneath boulders.

(8). Rock art panels. The numbers in this column refer to the number of panels at the site involved. A panel is defined as a group (or single item) of rock art figures somehow spatially distinct from the other rock art at the site, usually on different rock faces. The convention of calling pecked or incised figures "petroglyphs" and painted or charcoal figures "pictographs" has been followed in the site reports. Rock art, an inclusive term, is subject to more different and widely varied interpretations than anything in Dolores-like archaeology--from space travel to well-organized writing systems to ritual to graffiti.

(9). Fire. This includes any indication that fire was used at the site: hearths, charcoal stain, charcoal, smoke-blackened overhangs, burned stone, bone or earth. A fairly safe, standard, simple interpretation of this sort of evidence is, once again, camping or habitation.

Totals and percentages of the attributes in Table 2 are presented in Table 3.

TABLE 2

<u>Site Attributes - 1975 Survey</u>

SITE	1 Prepared Tools	2 Grinding Tools	3 Sherds	4 Flat Area	5 Sloping	6 Structure	7 Over-hang	8 Rock Art Panels	9 Fire
5DL187A	x	x	PI	x		x			
5DL187B	x			x					x
5DL188A				x					
5DL188B	x				I				
5DL177	x				I				
5DL178					II				
5DL179				x			x		x
5DL180			PI-PII	x		x	x		x
5DL181			PI	x		x	x		
5SM34	x			x					
5SM37					I				
5SM38					I				
5SM39	x	x			I				x
5SM40	x				I				
5SM41	x	x		x			x		x
5SM42A					I				?
5SM42B				x					
5SM42C				x					
5SM43A	x	x		x		cists	x		x
5SM43B					I				
5SM44	x			x			x		x
5SM45A	x			x		?	x	2	x

continued

TABLE 2 (Continued)

SITE	1 Prepared Tools	2 Grinding Tools	3 Sherds	4 Flat Area	5 Sloping	6 Structure	7 Over-hang	8 Rock Art Panels	9 Fire
5SM45B					I		x		
5SM46	x			x					
5SM47	x		PII-III	x		x	x		x
5SM48				x					
5SM49	x		1 Anasazi		I				
5SM50	x			x			x		x
5SM55	x				I				
5SM56	x			x					
5MN438					II				
5MN439				x			4	6	
5MN440A	x	x		x			x	1	x
5MN440B	x			x					?
5MN441A	x			x					
5MN441B		x			I				
5MN442A	x			x			?		
5MN442B		x		x			x		
5MN433		x		x			x		x
5MN434	x			x		x	x		x
5MN435		x			I		?		x
5MN436				x			x		
5MN437A				x			x		
5MN437B				x					
5MN443				x			x	12	x
5ME165	No collection			x			x	3	
5ME166	x	x		x					

TABLE 2 (Continued)

SITE	1 Prepared Tools	2 Grinding Tools	3 Sherds	4 Flat Area	5 Sloping	6 Structure	7 Over-hang	8 Rock Art Panels	9 Fire
5ME167	No collection			x				1	?
5ME168				x			3	3	x
5ME169	x			x					
5ME170					II				
5ME171				x		cist	x		x
5ME172A		x		x			x		?
5ME172B				x					
5ME173A				x			x		?
5ME173B					I				
5ME174A		x		x			x		x
5ME174B					I				
5ME175				x			x	2	x
5ME176	No collection			x		2			
5ME177				x					
5ME178					I				?
5ME179	x			x					
42GR584	x	?			I		x	2	
42GR585A				x					
42GR585B				x					
42GR586	x			x					
42GR587				x					
42GR588A				x					
42GR588B				x					
42GR589				x					
42GR590A	x			x					
42GR590B				x					

TABLE 2 (Continued)

SITE	1 Prepared Tools	2 Grinding Tools	3 Sherds	4 Flat Area	5 Sloping	6 Structure	7 Over-hang	8 Rock Art Panels	9 Fire
42GR591			2 Tusayan	x			x		x
42GR592A	x			x					
42GR592B					I				
42GR593A	x				I				
42GR593B				x					
42GR594A	x			x					
42GR594B				x					
42GR595					I				

TABLE 3

Totals and Percentages of Occurrence of Site Attributes of Sites Recorded in 1975

Note: Percentages are in parentheses.

Key	Areas	Prepared Tools	Grinding Tools	Sherds	Flat Area	Sloping	Structure	Over-hang	Rock Art Panels	Fire
1	81	31 (38.3)	13 (16.0)	6 (7.4)	58 (71.6)	23 (28.4)	9 (11.1)	29 (35.8)	9/32 (11.1)	26 (32.1)
2			12 (14.8)			I=20 (24.7)	6 (7.4)	25 (30.9)		20 (24.7)
						II=3 (3.7)	cists=2 (2.5)			
3			1 (1.2)				1 (1.2)	2 (2.5)		6 (7.4)

Key: Some recognition needs to be made that surface indications are often ambiguous. For attributes where certainty is not always possible a breakdown has been made:

1 Total possible and definite occurrences.
2 Definite evidence of association or presence, and alope category totals.
3 Questionable occurrences.

SITE ATTRIBUTE DISCUSSION

Classification of the predominantly non-structural and non-ceramic sites found below the Dolores River Ranch is difficult. Within the Anasazi area convenient indicators such as structural remains and pottery are sufficiently known from excavation that it is possible to derive a temporal and often a functional classification for most sites from surface remains. For several reasons, however, such a satisfactory framework for classification is lacking for the Dolores River sites recorded in 1975. The most meaningful classification for these sites is in terms of their function, especially since chronological indicators are few. Such classification is sometimes done on the basis of the presence or absence of an item such as a grinding tool. Because of the vagaries of soil deposition and erosion, prehistoric discard rate and practice, surveyor perceptivity, and especially previous collection of sites this practice is unreliable.

In accordance with the low level implications of the table entries a partial solution to the problem may be gained by combining the features to arrive at probable functions for some of the sites. By specifying a group of attributes with similar functional implications and requiring that a site display some minimum number of those attributes before it be classified as the variety indicated by the implications, reliance on the presence/absence of single items may be avoided. This approach is essentially "polythetic" as discussed by Williams, Thomas, and Bettinger (1973, and is felt to be the most realistic way to obtain an objective, approximate classification (see also Clarke 1968:35-7, 189-191). Before presenting such a use of Table 2 it should be noted that the attributes entered are primarily indicative of living area activity so that the main discrimination will be of that sort of site. Without greatly expanding the number of attributes to such things as tool types and tool wear or accessibility of game or vegetable resources (e.g., Judge 1973) separation of other activity areas is not possible. This is especially true since kill sites, lookouts, or vegetable procurement sites may be expected to leave far fewer material clues than living sites. While simplified and less than ideal, discrimination of living from other sites is similar to that proposed by the Southwestern Archaeological Research Group (SARG: Gumerman 1971). Finally it may be useful in determining the sorts of sites to be included in an excavation program aimed at understanding the range of prehistoric activities along the Dolores River.

Attributes indicating a living site are prepared tools, grinding tools, sherds, flat area, structure, overhang, and fire (columns 1-4, 6, 7, 9). A class I slope at a site need not exclude it as a campsite (especially in view of the possibility of slight post-use landform change) but class II slope associated with attributes normally thought to be living area indicators would necessitate further explanation and reevaluation. Rock art occurs with and without living site indicators. Somewhat arbitrarily a minimum of three of the seven attributes listed above was selected as the number of attributes required to assign a site to the probable living site category. The possession of more than three attributes increases the confidence of the assignment. Use of three as a minimum number may be seen to do two main things. First, it does not violate subjective evaluations from on-site impressions which are able to take into account variables in more abstruse relationships than are presentable here. Second, it excludes more enigmatic sites--such as structural site 5ME176--from living site designation which is both logically and intuitively correct.

The results of the above procedure are presented in Table 4. The utility of the polythetic approach is illustrated by the fact that no area contains all seven of the living area attributes.

As can be seen in Table 4 the method described separates 23 areas as living areas, or about 35% of the areas recorded in 1975. It is likely that some of the remaining 65% were also camps, though perhaps of somehow less intensive use thus leaving fewer surface clues. The indication is, however, that many of the sites were used for other purposes. As has been noted, the discrimination of these would involve more extensive analysis and inference more removed from the data than is possible here. One categorization that can be made with some confidence from data not in Table 2 is that of probable lithic material source. These sites are characterized by large numbers of flakes in association with apparent outcrops or other material source

TABLE 4

Probable Living Sites by Number of Attributes Present

(minimum of 3 maximum of 7 possible)

Attributes:	7	6	5	4	3	
		5SM43A	5DL187A	5DL181	5DL179	
		5SM47	5DL189B	5SM44	5SM39	
			5DL180	5SM45A	5MN442B	
			5SM41	5SM50	5MN435	
			5MN440A	5MN434	5MN443	
				5ME171	5ME168	
				5ME174A	5ME172A	
				42GR591	5ME175	
	0	2	5	8	8	23 Total

(often gravel terraces on the Dolores); slope is unimportant at such sites and may range up to that termed class II. Ideally items associated with core reduction such as primary flakes (i.e., flakes from the outside of a nodule), hammerstones, and cores would also be found at a source area. Sites fitting these general criteria are: 5MN442A, 5ME166, 5ME170, 5ME177, 42GR592B and 42GR594A.

While it was felt not to represent cultural activity, one phenomenon should be mentioned at this stage. Several small rock shelters under boulders were encountered that contained charcoal and burned bone. No cultural material was in any way associated with these features, but rat nests usually were. The most likely explanation seems to be that a rat nest somehow naturally caught on fire, but they are mentioned in case they should later be shown to be cultural. Most occurrences of this phenomenon are between Roc Creek and Gateway.

ARTIFACTS

On each site where cultural material was present a collection was made. An inventory of the contents of each collection with measurements and descriptions of tools is presented in Appendix A along with drawings of artifacts selected to give an idea of the sorts of tools present on the Dolores. A common problem in archaeological survey is the occurrence of isolated cultural remains that cannot be associated with visible "sites". Items not conforming to our definition of "site" as presented above were recorded as isolated artifacts, of which 20 were recorded. Appendix B contains descriptions, locations, and contexts of the isolated artifacts. Those isolated artifacts illustrated are in Figs. 5-13; the figures are in approximate geographical (down river) order and the isolated artifacts have been placed accordingly.

As has been briefly indicated above the interpretation of surface materials is subject to a special set of problems, primarily because of the increased insecurity that what is found represents what was left by the aboriginal users of a site and the question of whether all the material is contemporaneous. These problems are somewhat aggravated by the collection technique used. Time precluded truly systematic or truly random collection of sites, as such procedures would have involved setting up a grid for each site; a further pragmatic consideration in this regard is that limits of sites such as these are often very vague.

Both time and cargo capacity precluded the complete collection of all sites. The collections are thus "grab samples"; though not ideal they are no different from most survey collections. The implications for the collections are that they are not statistically reliable in a strict sense. Collecting bias runs toward (1) prepared tools, all of which are collected if seen, (2) obviously utilized flakes on the assumption that they will give more indication of site function and (3) unusual material. The bias runs against (1) marginal items, (2) very large items, (3) common unutilized items, (4) very small items. Because of the presence of many gravel terraces along the Dolores, the possible under-representation of marginal items is at times a considerable problem, especially since cobbles <u>were</u> an extensively used material and tool source. Natural fracture is often detectable but is also often difficult to distinguish from humanly produced fracture, particularly where there are questions of slope, bulldozer or other tumbling. Criteria such as concentration of material, its location, and surveyor judgment were necessarily employed in the determination of whether a questionable area was designated human and recorded, or considered natural and ignored.

Inference from Collections

Ideally there are three major closely interrelated and multilevel sorts of information that one hopes to derive from site collections: behavioral, cultural, and temporal. All of these are still available to some degree in the Dolores collections despite the limitations discussed. The sorts of analysis and classification used to approach the study of the collections will greatly influence the outcome of the study (under the influence of and simplified from Binford 1962; Sheets 1975).

(1). Behavioral. This aspect is fundamental to all others and, for the Dolores sites reported here, probably the most accessible. It relies basically on inferences as to tool function which, as with all the analyses discussed here, may be carried out at a number of levels. From the function of individual artifacts it may be possible to recognize combinations of items forming tool kits from which may be inferred activities. A second important facet of behavioral information is method of tool production as seen both in waste flakes and finished tools. The focus of this level of information is direct interaction with the environment. As the groups using the Dolores were in all likelihood egalitarian and as only surface data are at hand this "technomic" level is, again, the most apparent and important in the present case (Binford 1962, 1965).

(2). Cultural. When a behavioral inference has been possible for a site, it may be possible to assign the site to some archaeologically defined cultural pattern or group. Assignment of a site to a cultural group has two desirable effects: first, possible inferences about the site--such as temporal placement and range of conceivable uses of the site--are expanded and made more definite; second, the site in turn may contribute to both cultural historical and adaptational understanding of the group. Particularly at the present level of analysis, presence of typological artifacts is nearly essential for determining affiliation of a site. The best of these in the Southwest is pottery which is scarce on the section of the Dolores reported upon here. Projectile points are the most frequently relied upon non-ceramic artifact but their reliability as cultural indicators is suspect because of the wide distribution in space and time (see e.g., Madsen and Berry 1975, Aikens 1970, Willey and Phillips 1958) of "Archaic" point styles.

(3). Temporal. Typologically defined styles are also at this point a necessity for dating sites and artifacts in surface collections.

Lithic Materials

Crosscutting all of the above are questions of trade versus nomadic movement. Raw material sources are the most direct approach to defining the range of trade, material procurement, or seasonal movement, assuming tools are transported. Quarries are virtually unknown in southwestern and western Colorado. However, there are several indications that nearby local sources rather than a few major central ones were overwhelmingly important to the prehistoric users of the Dolores. This may be seen quite well in the changes in lithic material percentages as one moves down the river, even with the broad categories used (see Appendix A for category definitions). As can be seen in Table 5 quartzite composes over half the material collected in 1975. The breakdown by county in Table 5 reflects fairly accurately sections of the river to be discussed in the next section, though Montrose and Mesa Counties could perhaps have been combined. It is interesting that the material categories in these two counties are quite similarly distributed, supporting the contention that local availability probably largely determines what was used. The collecting bias discussed above probably tends to over-represent cryptocrystalline materials above Grand County, Utah. The dramatic shift to cryptocrystalline predominance seen in the last canyon before the confluence (Grand County) is the result of the certainly local occurrence of red and white (singly and mixed to varying degrees) chalcedony and variegated red and gold chert.

Local lithic materials are likely to have come from two main sources. The first of these is river cobbles and gravel terraces. Much of the quartzite used by the prehistoric peoples of the Dolores is probably from cobbles--many items have areas of cobble cortex remaining. In addition, it is likely that the fairly uncommon igneous materials are stream or glacier transported, as a number of intrusive igneous features are present around the headwaters of tributaries of the Dolores. These include the LaPlatas, Rico Mountains, the Lone Cone, and the LaSals. Obsidian, very scarce except at the Escalante Ruin, must have been brought in from some fairly great distance. Secondly, a number of the formations present along the Dolores also contain chippable materials. Warren (1967:118) notes the use of quartzite, chert, and siltstone of the Brushy Basin Member of the Morrison Formation in the Chuska area. The Morrison formation is present and exposed throughout the survey area. Cater (1970:44) states that the also common Dakota Sandstone contains a silicified sandstone sometimes used for stone tools (this would have been identified as quartzite here). Both Dakota and Burro Canyon sandstones also contain chert pebbles, which measure up to 7.5 cm in diameter (Cater 1970:42-46). Other sources are undoubtedly present nearby as well.

TABLE 5

Material Frequencies in 1975 Survey Collections

Note: Number of items in parantheses; all chipped stone included.

COUNTY	Quartzite	Crypto.	Siltstone	Igneous	Totals
Dolores & San Miguel	72.9% (690)	24.1% (228)	2.6% (25)	0.3% (3)	99.9% (946)
Montrose	60.3% (181)	20.0% (60)	16.7% (50)	3.0% (9)	100.0% (300)
Mesa	67.4% (199)	12.2% (36)	17.3% (51)	3.0% (9)	99.9% (295)
Grand	6.6% (28)	86.4% (369)	6.3% (27)	0.7% (3)	100.0% (427)
TOTAL	55.80% (1098)	35.21% (693)	7.78% (153)	1.22% (24)	100.01% (1968)

TABLE 6

Tool Type Occurrence
by River Section and Lithic Material

Section	Tool Type	Quartzite	Crypto.	Siltstone	Igneous	Total
PONDEROSA GORGE	points	11	9	0	[Iron 1]	21
(Dolores and	scrapers	2	2	0	0	4
San Miguel	knives	6	5	0	0	11
Counties)	bifaces	10	3	0	0	13
	choppers	9	1	0	0	10
	cores	7	4	0	0	11
	hammerstones	4	0	0	0	4
	flakes	641	204	25	3	873
	manos					5
LA SAL CREEK TO	points	1	3	0	0	4
WEST CREEK	scrapers	7	0	4	0	11
(Montrose and	knives	6	2	0	0	8
Mesa Counties)	bifaces	10	0	0	0	10
	choppers	9	0	1	0	10
	cores	7	3	5	0	15
	hammerstones	4	0	1	0	5
	flakes	343	88	90	9	539
	[manos]					6

TABLE 6 (Continued)

Section	Tool Type	Quartzite	Crypto.	Siltstone	Igneous	Total
BEAVER CREEK TO COLORADO RIVER (Grand County)	points	1	1	0	0	2
	scrapers	0	4	1	0	5
	knives	1	3	0	0	4
	bifaces	0	0	0	0	0
	choppers	2	1	1	0	4
	cores	1	14	4	0	19
	hammerstones	1	1	0	0	2
	flakes	22	345	21	3	391
	[manos]					0
COMBINED (All 1975 survey)	points	13	13	0	[Iron 1]	27
	scrapers	9	6	5	0	20
	knives	10	10	0	0	20
	bifaces	14	3	0	0	17
	choppers	21	2	2	0	25
	cores	15	21	9	0	45
	hammerstones	10	1	1	0	12
	flakes	1006	637	136	24	1803
	[manos]					11

TABLE 7

Chi-square table comparing
Tool Occurrence on
two sections of river

	Dolores San Miguel	Montrose-Mesa	TOTAL
Points	21 (14.2)	4 (10.8)	25
Scrapers	4 (8.5)	11 (6.5)	15
Knives	11 (10.8)	8 (8.2)	19
Bifaces	13 (13.0)	10 (10.0)	23
Choppers	10 (11.3)	10 (8.7)	20
Manos	5 (6.2)	6 (4.8)	11
TOTAL	64	49	113

$\chi^2 = 14.06$
d.f. = 5
$.01 < p < .02$
(expected values in parentheses)

TABLE 8

Chi-square tables for
Tools by Raw Material

a. Total 1975 collection, excluding siltstone and igneous materials

	Quartzite	Cryptocrystalline	TOTALS
Points	13 (15.6)	13 (10.4)	26
Scrapers	9 (9.0)	6 (6.0)	15
Knives	10 (12.0)	10 (8.0)	20
Bifaces	14 (10.2)	3 (6.8)	17
Choppers	21 (13.8)	2 (9.2)	23
Cores	15 (21.6)	21 (14.4)	36
Hammerstones	10 (6.6)	1 (4.4)	11
TOTALS	89	59	148

$\psi^2 = 25.83$
d.f. = 6
$p < .001$

TABLE 8 (continued)

b. Dolores, San Miguel, Montrose, and Mesa County collections only.

	Quartzite	Cryptocrystalline	TOTALS
Points	12 (17.4)	12 (6.6)	24
Scrapers	9 (8.0)	2 (3.0)	11
Knives	12 (13.8)	7 (5.2)	19
Bifaces	20 (16.7)	3 (6.3)	23
Choppers	18 (13.8)	1 (5.2)	19
Cores	14 (15.3)	7 (5.7)	21
TOTALS	85	32	117

$$\psi^2 = 16.87$$
$$d.f. = 5$$
$$.001 < p < .01$$

(expected values in parentheses)

TOOLS

Materials used for tools follow fairly closely the overall distribution of materials for the total assemblage as well as for the canyon segments (allowing for the smaller sample size and its effect on percentages). Were one to separate the smaller, finely worked prepared tools such as projectile points and knives a distinct preference for cryptocrystalline materials would be evident, with percentages of cryptocrystalline highly disproportionate to overall percentages in the high quartzite frequency segments. The same would be true of utilized flakes, though this is partially due to the visibility of wear on cryptocrystalline as opposed to quartzite flakes.

The reader is once again referred to Appendices A and B for details on artifacts. Some limited general comments are possible with respect to the tool categories:

Projectile points. Reference to literature concerning adaptations similar to that on the bulk of the survey area from both the vicinity (Wormington and Lister 1956; Buckles 1971; Hurst 1939-1948) and more distant areas (Aikens 1970; Jennings 1957; Irwin and Irwin 1959; Irwin-Williams and Irwin 1966) reveals that a wide variety of shapes often broadly distributed through time. This seems to be the case on the Dolores as well. The most common forms are variations on mid-sized, corner-notched points, with smaller points more likely to be side-notched. Atlatl dart points are frequently distinguished from arrow points were recovered, nor were indented-based Pinto or Duncan-Hannah-like points, though the latter are known for the Dolores and vicinity (Breternitz and Martin 1973; Zier and Robinson 1975; Toll 1975). Two points are more amenable to cultural or temporal classification: The side-nothced point from 5SM47 (Fig. 7h) is similar to later Pueblo styles (PIII) which is substantiated by the few ceramics associated, and the metal point from 5DL188B (Fig. 5d) is necessarily late, probably post-1800. A number of the projectile points show wear indicating use for cutting or other functions in addition to or instead of projectile use.

Knives and bifaces. The distinction between these two classes is somewhat arbitrary. It has primarily to do with thickness, fineness of retouch, and width, knives being thinner, more delicately retouched, narrower and more elongate. Knives usually show longitudinal (i.e., parallel to the edge) use (Figs. 7g; 9b; 10c; 11b; 13a, c). Bifaces (Figs. 5e, f; 6a, g; 7a, d, j; 10f; 11a, c) tend to either show heavier wear or none. The latter instance suggests that some of these may be preforms or even spent cores. The usual regular outline legislates against the core possibility. Bifaces also tend more often to be quartzite, knives cryptocrystalline though this is not a hard and fast rule.

Scrapers. All the items classed as scrapers in Appendix A are modified flakes with the modification being almost solely of the working edge. The most common type are on thick quartzite or siltstone flakes;

fairly heavy wear is present on some. Two sites, 5MN437A and 5ME174A have several such tools indicating a common activity. The size and heavy use on these tools suggests plant rather than hide processing, though this interpretation is entirely speculative (Figs. 5b; 9e, 12a, b, d, e). A few smaller, more nearly "classic" end scrapers are also present in the collections (Figs. 6b; 7f; 13d).

Cores. The identification of a core is sometimes tenuous; here it was generally required that there be at least two recognizable flake removals before the item was designated as a core. The approach to core reduction covers a range of degrees of organization, from apparently completely random flake removals to an orderly process. The latter is characterized by creating an edge (often apparently dictated by the shape of the original cobble) and proceeding around that edge removing flakes from either face. This process would seem to have two advantages: (1) future flake removals are facilitated by the creation of platforms and of scar ridges that will direct and support subsequently removed flakes; and (2) the resultant edge is available as a chopping edge (and was often used as such). Very highly organized procedures such as prismatic blade cores are not indicated, though occasional probably fortuitous blade-like flakes are found (see 5SM50 in Appendix A and Fig. 7e).

Choppers. Choppers have been defined largely on the basis of signs of heavy use. As noted, they are frequently utilized cores (Figs. 5c; 9d) and choppers are distinguished from cores when the flake removals appear to be solely for the creation of a working edge. Choppers are usually heavy with fairly wide edge angles. Items identified as choppers are thicker, larger, heavier, and less completely retouched than those termed "bifaces" (Figs. 6h; 10b; 11a).

Hammerstones. Cores, choppers, and manos all were sometimes used for pounding. Items classed strictly as hammerstones are unmodified pebbles. Heavily used hammerstones, modified or otherwise, usually have a convenient "hand-sized" quality (Fig. 13e).

Ground stone. The nine handstones collected exhibit the full range of manos from Archaic sites: shaped and unmodified cobbles, unifacial and bifacial, smooth and pecked faces are all present. Only three nether stones were observed: an Anasazi trough metate at 5DL187A; an oval ground basin on a boulder near 5ME166; and, a basin fragment at 5ME174A.

Ceramics. All of the 37 sherds collected, 31 from three sites south of Dove Creek, are Anasazi. Pottery of any sort, whether "Ute" or otherwise is very uncommon from the vicinity of the Dolores to the east (Wormington and Lister 1956; Buckles 1971; Breternitz, Newsom and Toll 1973; Toll 1975; Stevens 1975; Appendix C). It seems to increase in frequency as one moves west (Hunt 1953; Wormington 1955). North of Dove Creek sherds are so infrequent on the Dolores that nearly nothing may be said about them. It is, however, interesting that two of the four occurrences appear to be Tusayan Gray Wares (5MN76, 42GR591) rather than the closer Mesa Verde Grays (5SM47, 5MN75). Suggestions of Northeast Arizona materials (or manufacture techniques) are also seen in Hunt's (1953) ceramics identified as Hopi, and Ambler's (1966) postulated main stream of diffusion to the Fremont area from the Anasazi area.

Perishables. The sandal from 5SM50 (Fig. 8) serves as a reminder that surface collections represent only a portion of the total material culture. Hurst's (1947) excavation of Dolores Cave rounds out the picture somewhat with its bone, hide, juniper bark, wood and other artifacts. Surface evidence of juniper bark and wood use is present at several overhang sites recorded here. The sandal itself is interesting in that it seems more like Anasazi sandals than Archaic examples; the presence of a corn cob at the same site adds further to the speculative possibilities for the site.

Figure 5. Artifacts. a, point, 5DL177; B, scraper, 5DL179; c, core/chopper, 5DL181; d, iron point, 5DL188B; e, biface, IA#4; f, biface, IA#6; g, point (?), IA#6.

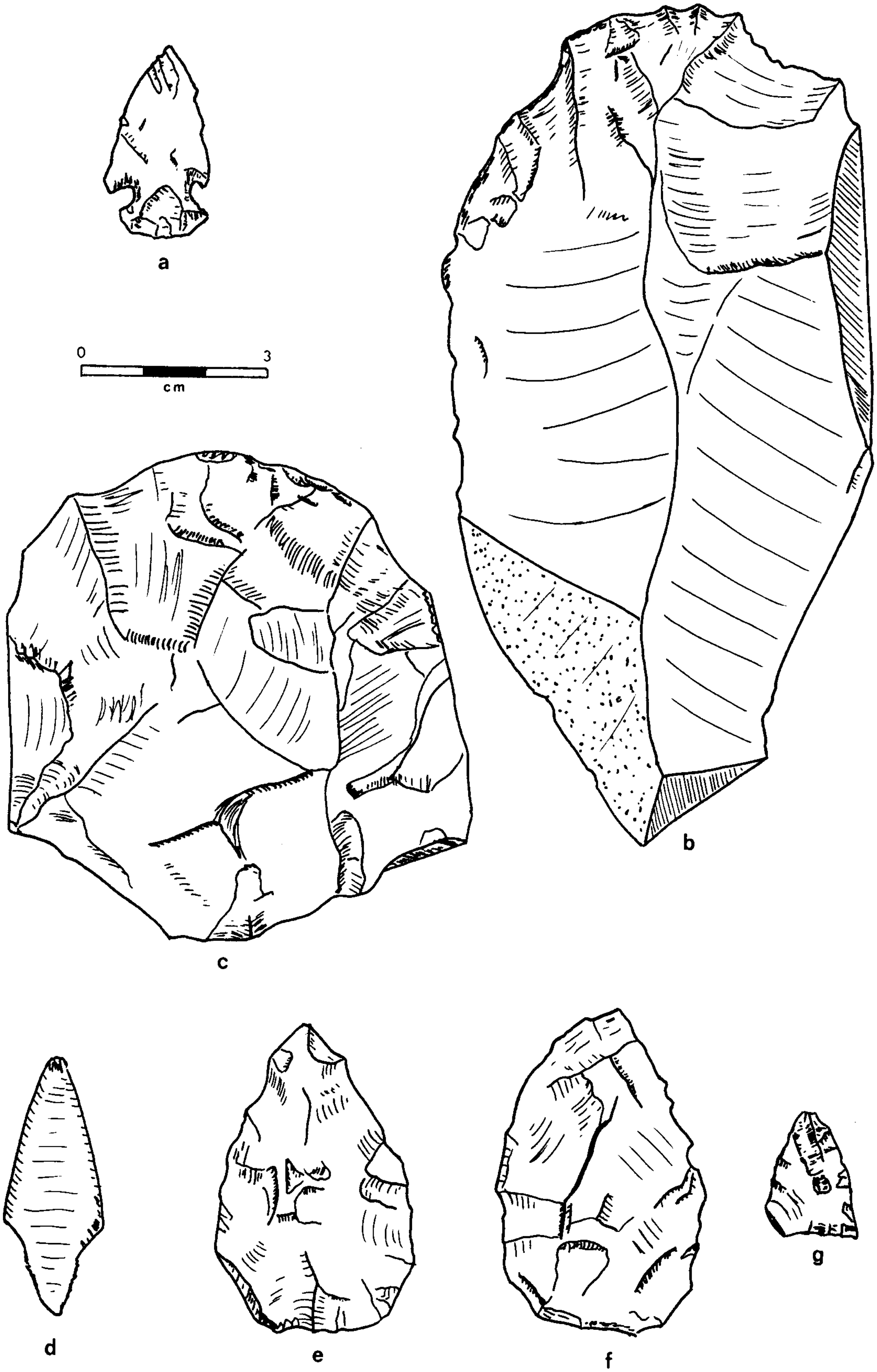

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Figure 6. Chipped stone. a, biface, 5SM38; b, scraper, 5SM39; c-d, points, 5SM40; e, point, I.A.#7; f, point, 5SM41; g, biface, 5SM41; h, chopper, 5SM41; i-k, points, 5SM43A.

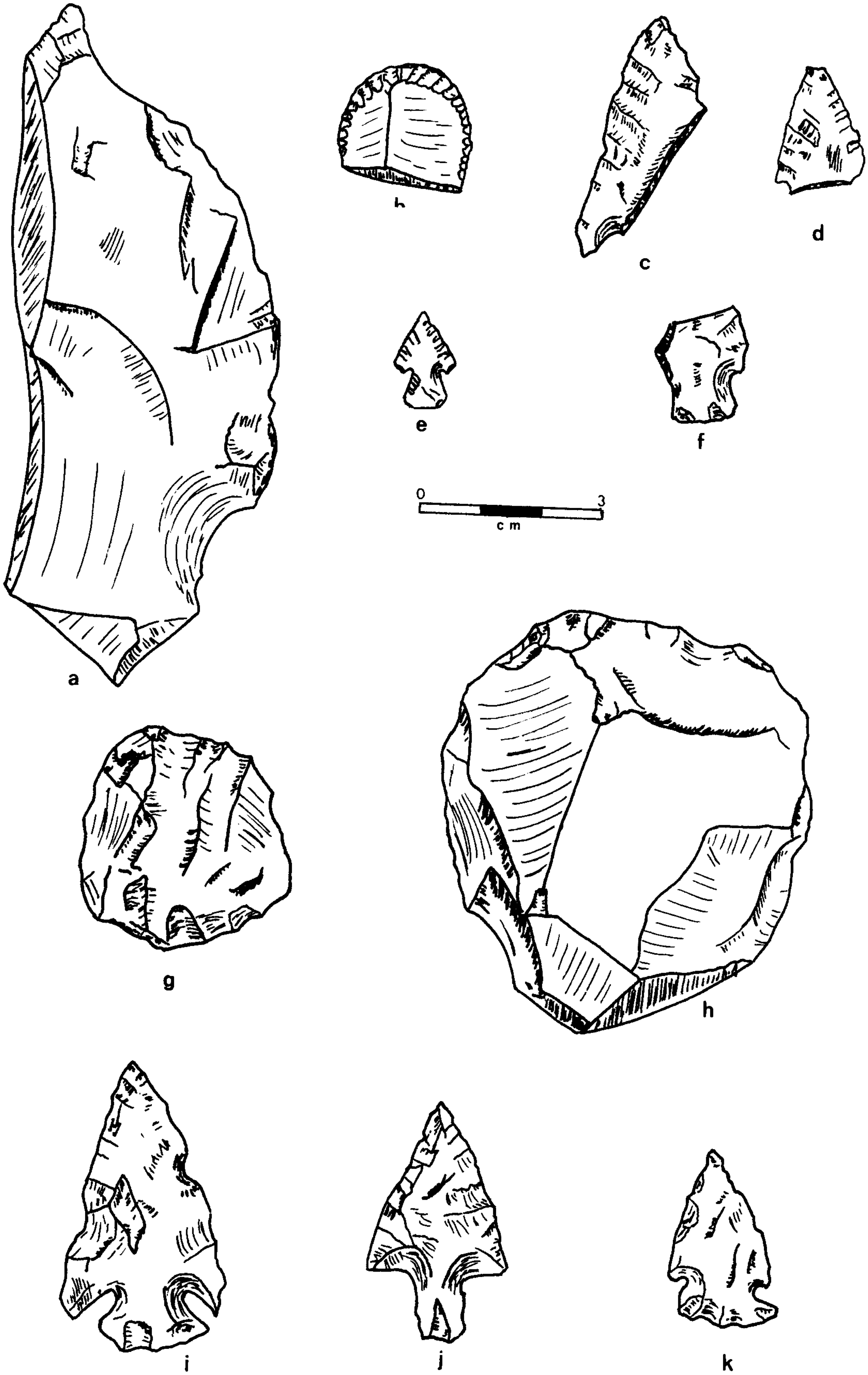
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Figure 8. Sandal, 5SM50. a, view of the underside of the sandal showing twilling; note the slight wear at the heel and the gathered heel (right); b, top view showing juniper bark lining, gathered and knotted heel, and tie loop (lower edge) with portion of tie remaining. Scale = 10 cm.

a

b

Figure 9. Chipped stone. a, point, 5SM50; b, knife, 5SM56; c, point, 5MN434A; d, chopper, 5MN439; e, side scraper, 5MN440A; f, point (?), 5MN440A.

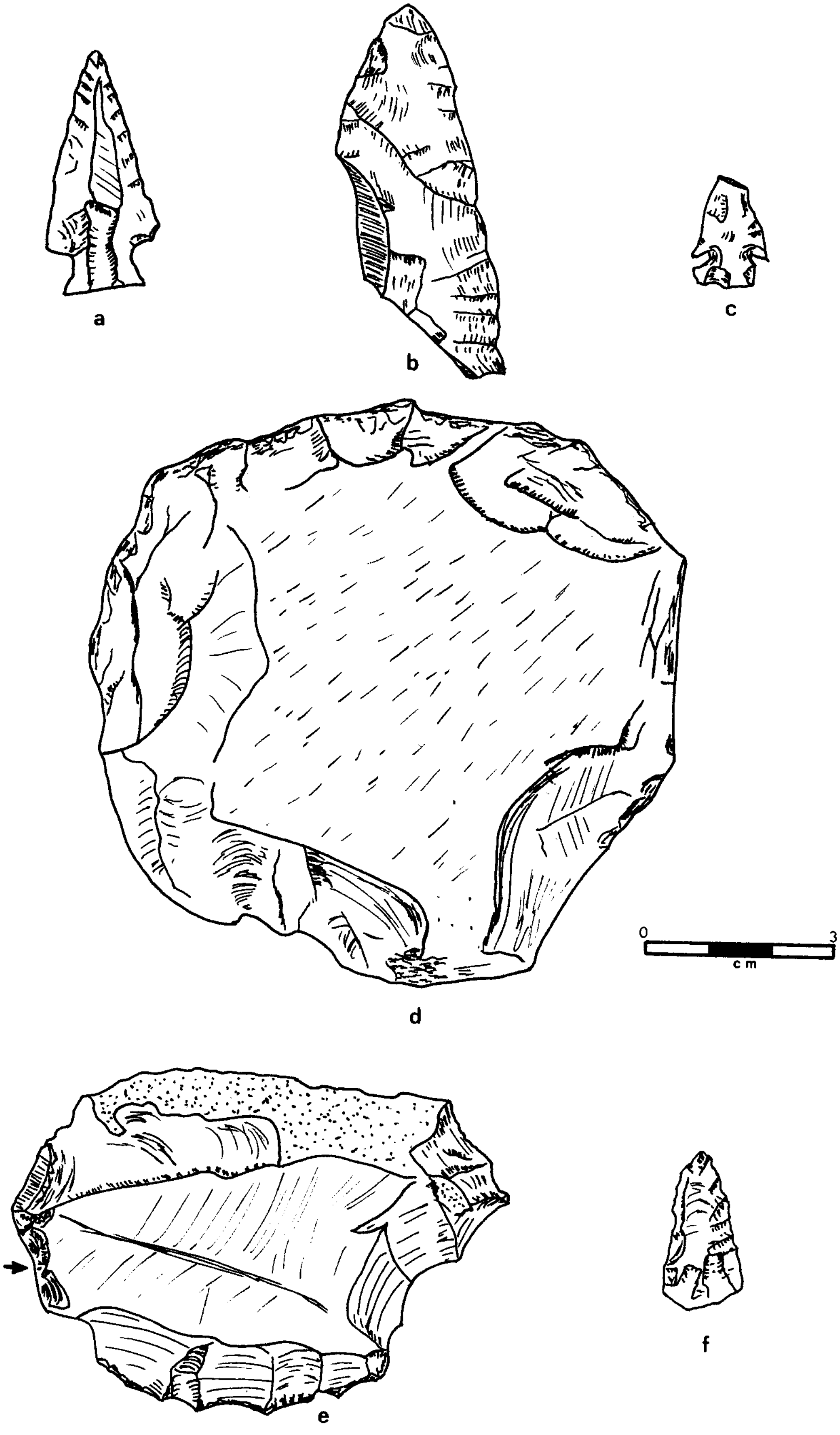
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Figure 10. Chipped stone. a, scraper, 5MN437A; b, chopper/perforator/core, 5MN440B; c, knife, 5MN441A; d, point, 5MN441A; e, biface, 5MN442A; f, biface, 5MN443.

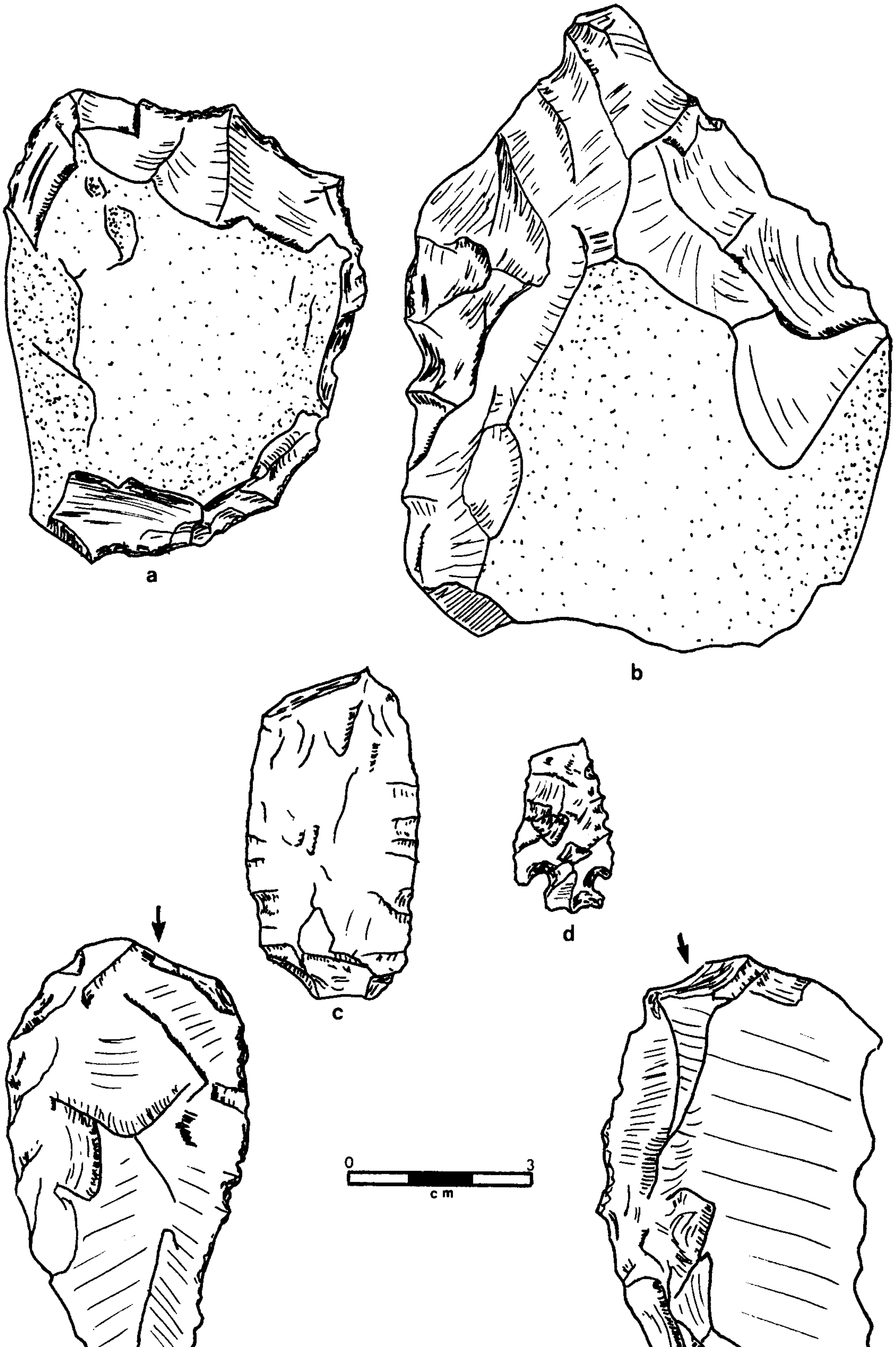
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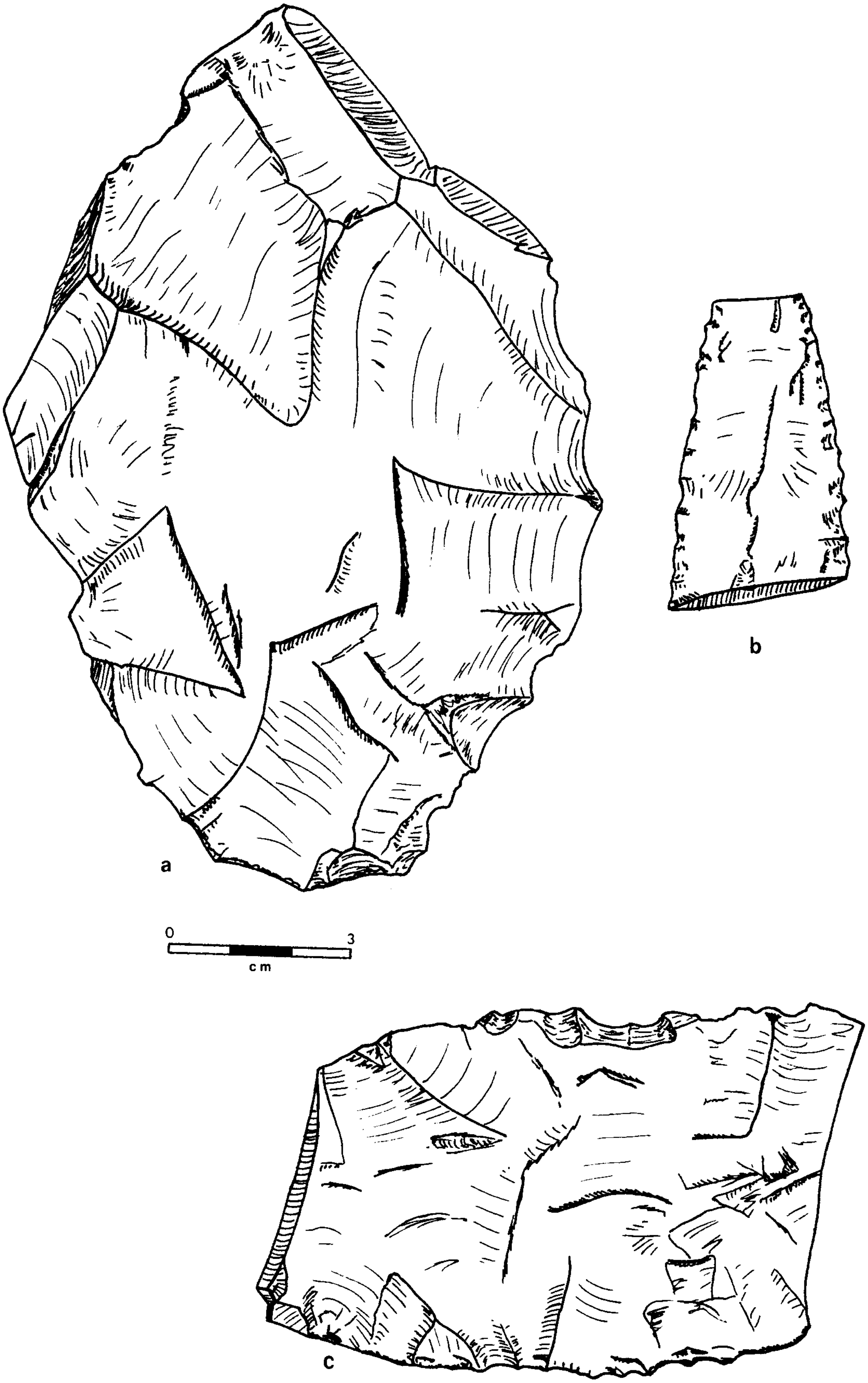
Figure 11. Chipped stone from 5ME166. a, biface/chopper; b, knife; c, biface.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c

Figure 12. Chipped stone. a, scraper (top view and lateral view of working edge), 5ME171; b, scraper (forsal and distal views), 5ME174A; c, point, 5ME179; d-3, side scrapers, 5ME174A; f, point IA#15.

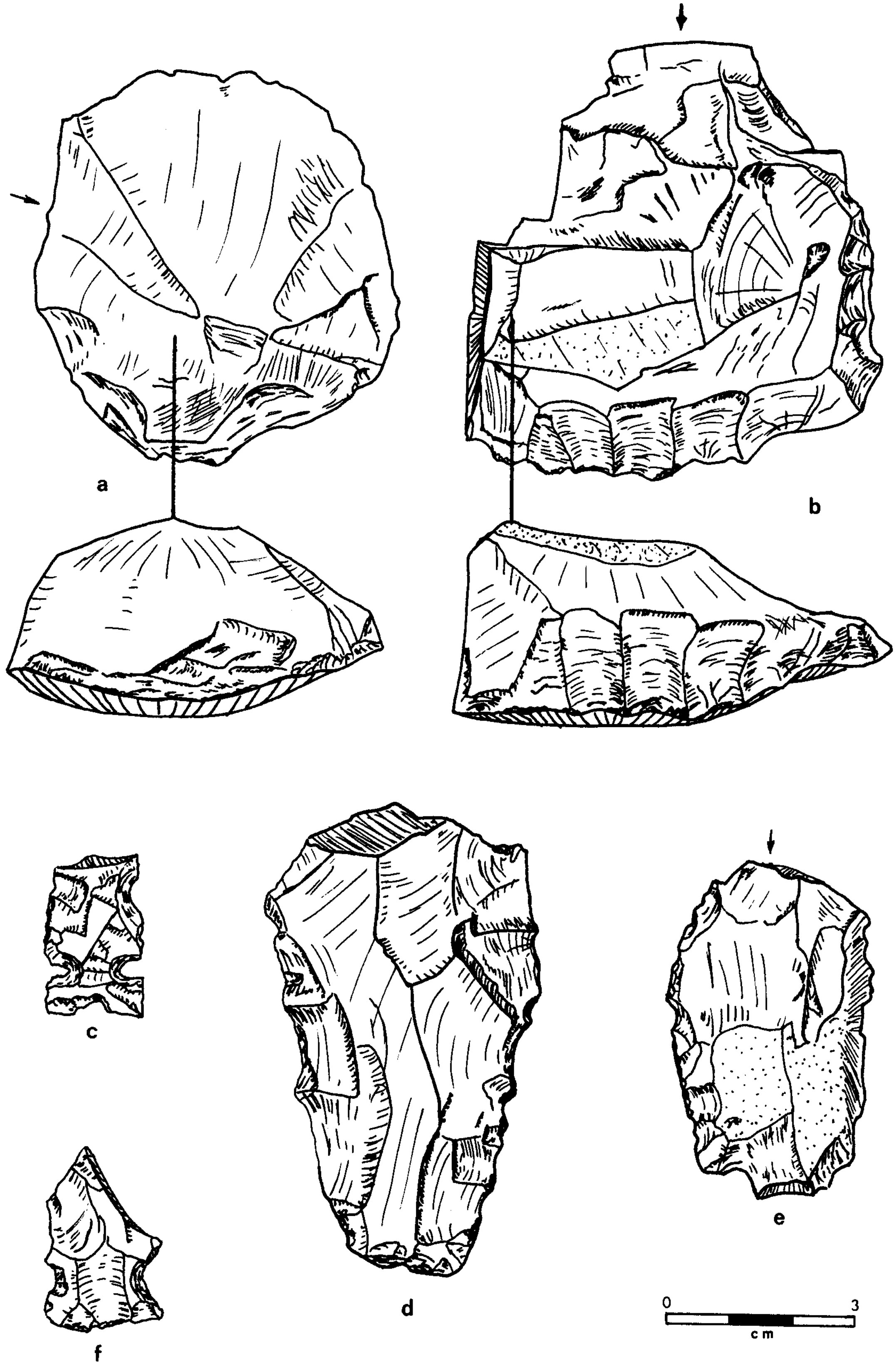
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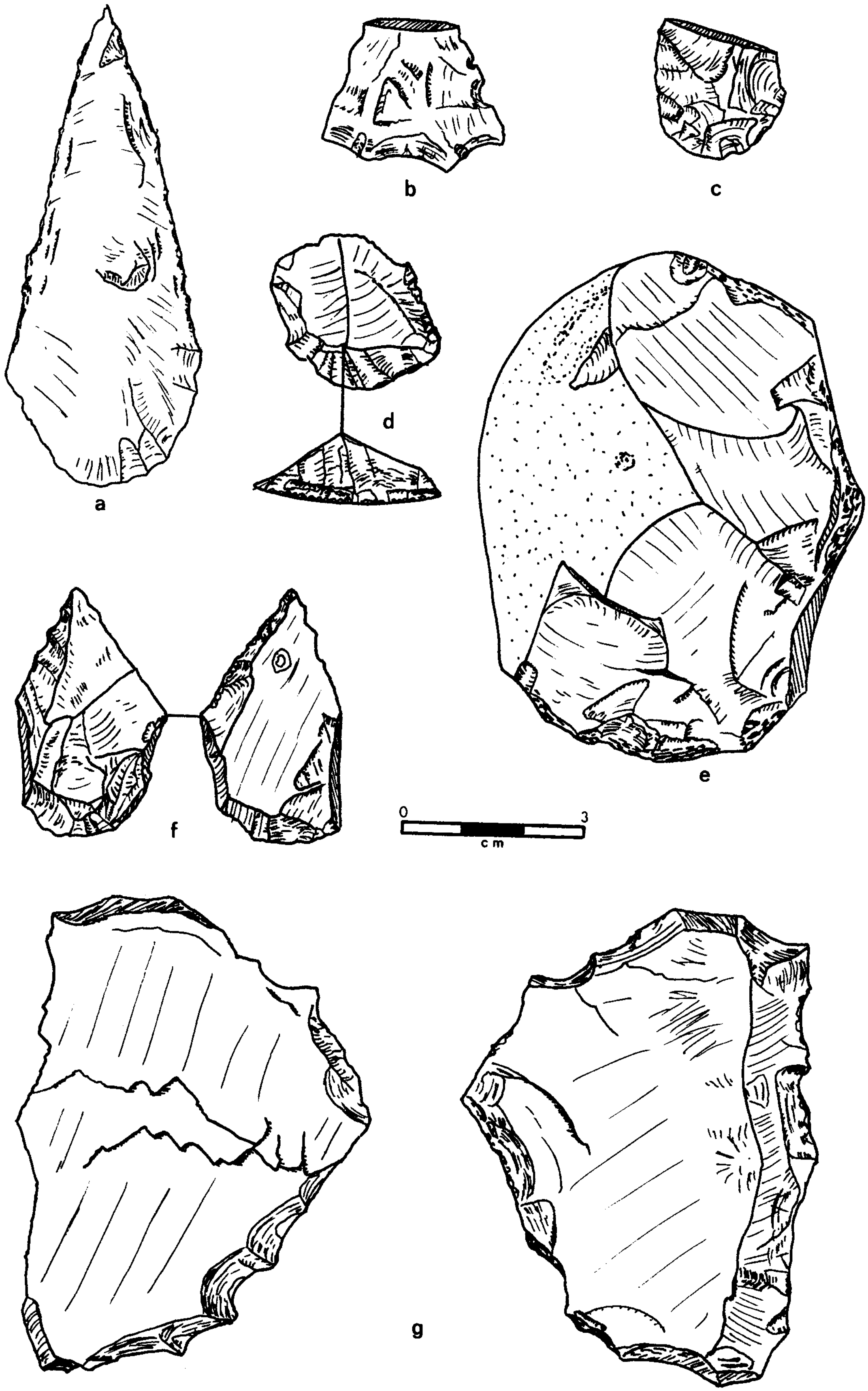
Figure 13. Chipped stone. a, knife, 42GR584; b, point, 42GR585B; c, knife, 42GR586; d, scraper (dorsal and distal views), 42GR587; e, hammerstone, 42GR587; f, borer/scraper (dorsal and ventral faces), 42GR590A; g, scraper (both faces), 42GR593A.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TOOL OCCURRENCE --AREAS AND MATERIALS

Table 6 shows a breakdown of tool types as they occur (1) by physiographic divisions of the river in which collections were made in 1975 and (2) by material types as defined in Appendix A. It should be noted that when a core was utilized (as is frequently the case especially with quartzite cores) it was counted only under its interpreted function (not under "core") and that manos are not considered with respect to material.

As noted above the overall lithic material distribution makes a marked shift in the Grand County, Utah, section. The Chi-square test on quartzite, cryptocrystalline, and siltstone materials by the divisions in Table 6 (rather than that in Table 5, where the figures are presented), gives a very high chi-square (over 2600, d.f.=4) with the largest contribution coming from Grand County.

The information in Table 6 is also amenable to analysis by chi-square in the examination of two differences in distribution: that in tools as per environmental zones and that in tools as per material. One of the assumptions of the chi-square test is of course that the sample is random. As has been discussed above, our survey samples do not meet this assumption strictly speaking. However, in the name of using what's available and since "complete" tool collections were attempted a brief examination of the data in Table 6 will be made. Where effected, inclusion of the flake counts can be regarded as a form of setting a material standard for a river section since the overwhelming size of the flake counts as compared to other items dictates that their expected frequency will vary little from the observed; the non-random collection caveat is more applicable to flakes than tools here.

Tools by river section. Table 7 compares the Ponderosa Gorge area collections with those from Montrose and Mesa Counties; the tool counts from the Grand County collections are so small as to invalidate the use of chi-square because of low expected frequencies. The two areas do differ significantly ($p < .02$) in tool distribution, with the main contributions being from points and scrapers. If the standard (and somewhat naive) interpretation that "projectile points" indicate hunting and the present interpretation that the large "scrapers" found especially in the Montrose-Mesa county stretch of the river are for plant rather than hide processing be accepted, a difference in emphasis in the two areas is suggested. The higher-than-expected observed frequencies of manos and choppers for the lower or "plant emphasis" area tends to back such a suggestion. By inspection the trend in the lower area seems to continue in Grand County, though at least two of the scrapers from Grand county are smaller, more "classic" end scrapers. The high frequency of cores may mean that Grand County was a material source area for the cryptocrystalline materials previously described. Also of interest are the close similarity of observed and expected values for knives and bifaces, which can be interpreted as meaning that this class of tools was basic to the archaic tool kit, with subsistence variability perhaps showing in other tool classes. The category "biface" is, however, admittedly broad here; it is probable that refinement of the category removing the smaller, leaf-shaped bifaces (see Figs. 5e & f, 7j) would show these small bifaces distributing more like the projectile points. The complete absence of bifaces in Grand County further suggests that there was some task associated with such tools, possibly hunting related. That bifaces also show a high association with quartzite may also be important in the explanation of their absence in Grand County.

<u>Tools by material</u>. It is highly likely that different lithic materials were selected for different tools. The selection was naturally partly dictated by availability as has been seen in the overall material distributions. Once again employing the faithful chi-square demonstrates several such preferences (Table 8). It was necessary to eliminate the siltstone and igneous categories because of small expected values, but the use of siltstone only for scrapers, choppers, and cores and the non-use of igneous materials for prepared tools are apparent (Table 6).

Table 8 indicates:

(1) a preferential use of cryptocrystallines for projectile point manufacture. They may be understood in terms of the greater workability of cherts and chalcedonies and perhaps by the smaller size of available cryptocrystalline nodules as compared to other

materials (i.e., it would not be feasible to manufacture a heavy implement such as a chopper with the cryptocrystalline material available. A similar pattern of preference is present for "knives" which by definition here require finer flaking control than the other tools (such as bifaces).

(2) higher frequencies of quartzite choppers and bifaces than expected statistically. While this is also probably partly a function of the size of available raw materials, test with quartzite indicate that quartzite edges are very durable (see also Crabtree and Davis 1968). For this reason it may also be that quartzite flakes were especially useful in unmodified form.

(3) comparison of Tables 8a and 8b (which include and exclude Grand County respectively) send further support to the possibility that Grand County was a material source.

(4) quartzite also appears to make a durable hammerstone, and, again, an available and large enough one.

In spite of the fact that only 6.6% of the total material collected from Grand County is quartzite (Table 5), it is interesting to note the use of quartzite for 2 choppers, a knife, and a point. While it cannot be taken much further with these data, it may well be that raw material should enter more heavily into classifications, particulary those based on function.

ARTIFACTS FROM PARADOX VALLEY

In hopes of getting some idea of what sorts of artifacts were directly associated with structures, an attempt was made to study the Woodburys' collections from 1931. The attempt was in several ways thwarted, but the results that were obtained are presented in Appendix C. Proveniences are not at all certain and the collecting technique in evidence is highly suspect--for example, only 27 of the 241 catalogued items are chipped stone and all are tools. Because of the Woodburys' bias toward structures already noted (see Survey Method and Assessment of Coverage, Unsurveyed Areas, P. 13), it seems safe to assume that even if the lithics are surface items they came from "mound" sites in Paradox. Plainly the bone came from excavations so it may well be that all the lithics in Appendix C came from the Woodburys' (1932) "sounding trench" at "Mound 2".

Two main topics may be discussed from the Paradox material examined. The first is that the projectile point forms and sizes are remarkably consistent when compared to the variety noted for Archaic assemblages. Perusal of a number of site and survey reports shows a consistent appearance of point styles generally similar to the small basally to corner-notched points that comprise most of the Paradox specimens (Fig. 14). A listing of areas where such points have been found gives some idea of the geographic scope of this appearance.

Hogup Cave and Danger Cave--"Eastgate Expanding Stem" (Aikens 1970: 35, 45, 50-1; Jennings 1957: 129), Aikens (1970: 56) cites stratigraphic distributions of Eastgate Expanding stem and other points that indicate that many styles do not make good time indicators--a "long chronology" interpretation (Thomas 1975:501-2). However at both caves the style in question clusters well stratigraphically and that clustering matches the ceramic distribution at Hogup quite well (see also Madsen and Berry 1973:394). Dates for the major occurrence of these points seem to be ca. A. D. 400 to 1300 (Madsen and Berry 1975:397).

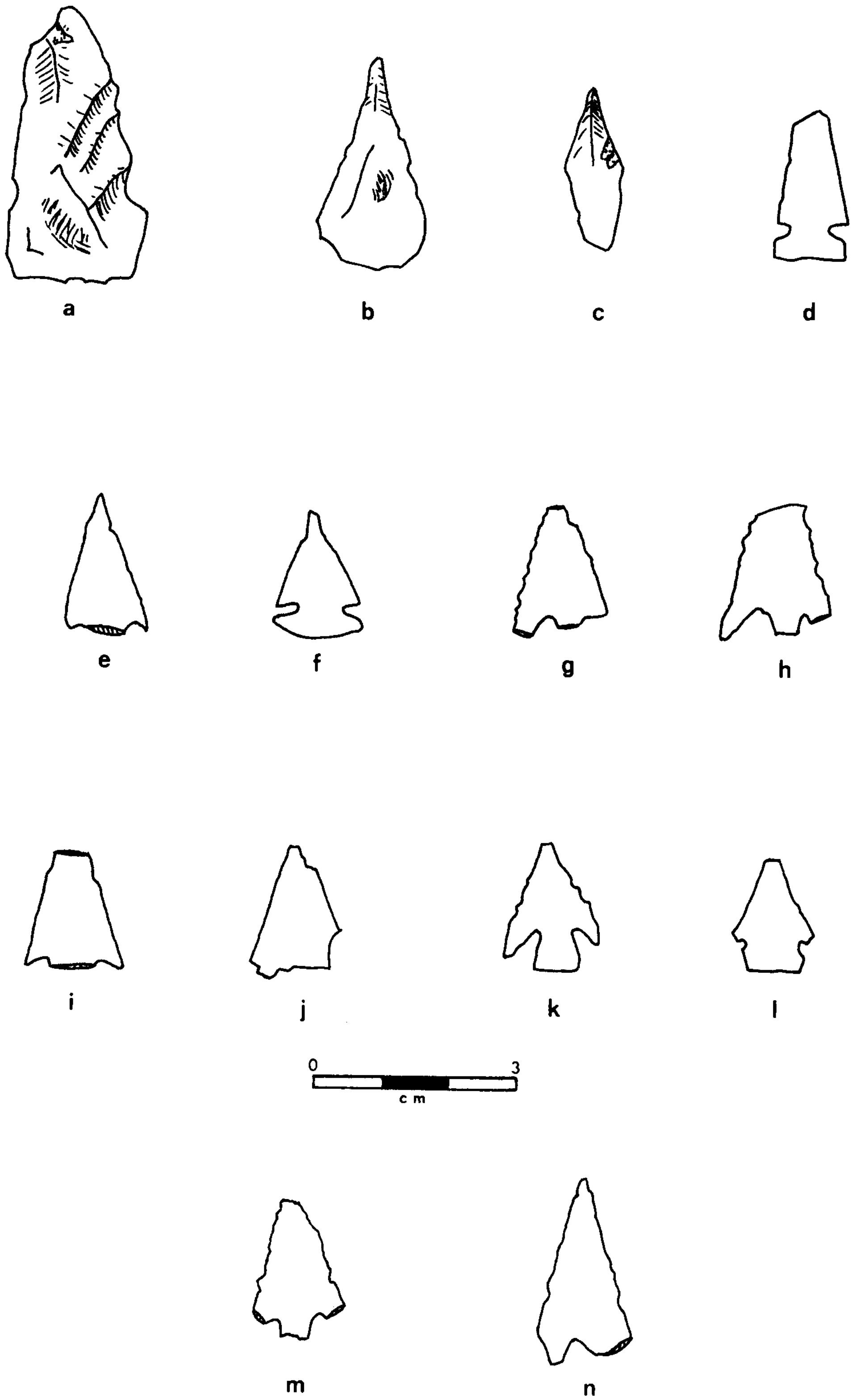
La Sal Area (Hunt 1953:32-3). Of 11 specimens of basal to corner-notched, two to three centimeter long, long-tanged points, eight were in association with pottery and seven with masonry.

Pueblo Area (for example and summary of proveniences, Hayes and Lancaster 1975:144-5). Points generally similar to the varieties described here are consistently associated with Basketmaker III to Pueblo II features (roughly A.D. 450 to 1100).

Uncompahgre Drainage (Buckles 1971:119, 1220). Here the genre (astutely avoiding terms like "type") is associated with the Coal Creek Phase placed at A.D. 700 to A.D. 1300 (pp. 1276-82.)

The significance of the above is first that, in combination with the "Pueblo II" pottery, the point information allows a probabilistic statement as to the time range within which the Paradox site rests, second that possible associations of similar points from other sites may be made, third the implications of bow and arrow technology (Madsen and Berry 1975:394; Buckles 1971:1221), and, most importantly, the illustration of the fact that many different elements of material culture tend to be similar in a broad Southwestern geographical context. These broad similarities, the second major point brought out by the Paradox materials, are further borne out by the bone artifacts. Particularly the awls may be seen as falling within the range of variability from other Southwestern sites (Kellie Masterson, personal communication--see Appendix C). The consistency seen might help in showing the use of non-structural sites by structure-using groups (e.g., I.A. 7, fig. 2e and 5MN434A, fig. 5a), but the wide distribution of similar points and the variability within styles emphasizes the caution necessary in making such an inference.

Figure 14. Outline drawings of chipped stone from Paradox Valley collected by the Woodburys in 1931. a, bifacial preform or knife (#05066); b, drill (#05031); c, graver (#05055); d-n, points; d, #05092; e, #05054; f, #05034 with some probable use as a drill; g, #05061; h, #05062; i, #05033; j, #05063; k, #05055 (apparently same catalogue number as c?); l, #05036; m, #05060; n, #05056.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ROCK ART

Rock art is a topic especially prone to speculation of various types for a number of reasons. It is rarely datable by chronometric means (especially true of petroglyphs) and artifact associations are far from definite (especially true of surface artifacts). It is more nearly in the realm of the ideational than most information available to archaeologists. By the same token, it would seen to be freer to vary stylistically than artifacts are, hence being more likely to show temporal change and cultural variation. Stylistic change is especially attractive to students of rock art who almost invariably make a statement about the inferential potentials of rock art were more known about attributes and distributions (for example, Buckles 1971; Schaafsma 1971; Turner 1963). Because of the tantalizing nature of rock art, a wide number of schemes of varying definition have emerged, making both temporal and cultural assignments. No addition to the confusion will be made here, but some attempt to relate the Dolores rock art to the existing ideas should be made.

It is noteworthy that, when drawing geographical rock art areas, students of rock art generally depict territories considerably larger than the usual culture areas. Thus Turner (1963:40) includes from the southern half of Wyoming to an undetermined distance into Chihuahua and from eastern California to eastern Colorado inside his Style 4 and 5 boundaries. Styles

4 and 5 he specifically attributes to the Anasazi periods from Basketmaker II-III (or earlier) through early Pueblo III. Grant (1967) depicts an expanded "south-west". The point is that a number of figures and motifs have very wide distributions; among these figures are the mountain sheep and the "bear" track both of which are common on the Dolores. The Dolores rock art further fits patterns in the more immediate area by consisting primarily of pecked figures with painted items infrequent (see Hunt 1953; Buckles 1971; Schaafsma 1971; Turner 1963). Turner's Style 5 (1963:37-8) is equated culturally with the Desert Culture. In the light of the cultural discussion that follows the Environmental Context section below, it is interesting (perhaps even significant) that Style 5 is most similar to much of the Dolores rock art and most of the Uncompahgre drainage art (Buckles 1971:1132). Similarities from the Dolores to Turner's style 4 include solid pecking of figures and a number of the elements common to Style 4 (1963:6-7).

Buckles (1971:1132) and the Huschers (1940) both note "the striking absences of influences from art of cultures of surrounding areas, particularly the Fremont Culture and Anasazi Culture areas" (Buckles 1971:1123). On the Dolores, however, figures are present which are most often found in the Fremont and Anasazi areas. Anthropomorphs are the figures most often given cultural labels and the only element amenable to such comparisons on the Dolores, since geometrical pottery designs are not present.

In attempting to arrive at some working definition of what constitutes a "Fremont petroglyph" or "Anasazi rock art" one encounters a frustrating yet educational array of conditionals and gray zones. There are some truly distinctive classes--most notably the "Classic Vernal Style" (Schaafsma 1971:8-25)--but they are restricted in space, mostly to northeastern Utah. As an illustration of the complexity involved, it is fairly safe to say that the most diagnostic "Fremont" figure in an overall sense is a trapezoidal anthropomorph with horned headdress. There is frequently body decoration and sometimes exaggerated hands and feet. Body shape is sometimes rectangular or triangular and non-geometrical anthropomorphs are sometimes on panels with geometrical figures (see Schaafsma 1971:28-67 for examples). Turning now to "Anasazi" anthropomorphs it is found that triangular bodies are "typical" of Pueblo figures (Schaafsma 1963) though they frequently grade to the trapezoidal and rectangular (see Schaafsma 1963:8-20; Turner 1963; Jeancon 1926:41). Overlaps with "Fremont" figures may be seen in that the Pueblo anthropomorphs are sometimes horned or have other headdresses, have exaggerated appendages and body decoration (this last perhaps less often). The most confidently assigned Anasazi anthropomorph is the flute player; Schaafsma indicates that linked anthropomorphs are more frequent in Anasazi panels (1963: 12-19, 25; 1971:138). A trait list such as the above does not convey qualitative elements which convince serious students such as Schaafsma that there _is_ such a thing as Fremont style (as opposed to Anasazi) rock art (1971:137). It does however raise points that are of repeated importance in subsequent discussions: especially with surface data (which is in many ways analagous to rock art data) rigid cultural assignments between Fremont and Anasazi and even "Archaic" are not possible. The evidences are in many senses continuous and thus must be viewed in as full context as possible. There is perhaps some comfort in the apparent absence of anthropomorphs such as those described above on the east side of the Uncompahgre Plateau.

Eighteen of the 32 panels of rock art recorded in 1975 are from two sites: 5MN439 and 5MN443 (a total of 47 panels have been recorded below the town of Dolores within the canyon since 1971). One of these sites is at the mouth of Roc Creek the other near the mouth of La Sal Creek and within five kilometers easy walk of Paradox Valley. It is interesting that it is only at these sites and at 5SM14 in the Big Gypsum Valley (Fig. 17) that triangular-trapezoidal anthropomorphs (which are apparently associated with horticultural people) appear. Other non-rock art horticultural evidences in Paradox and Roc Creek are discussed above and below. Similar figures occur in the La Sals (Hunt 1953) and in La Sal Creek Canyon (Jeancon 1926:40, 43-4) and near Tabeguache Cave I (Hurst 1940:6). 5MN439 and 5MN443 typify the difficulties cited above in making assignments of Fremont or Anasazi. At 5MN439 (Fig. 18) are five figures which are most nearly "Fremont" (as compared to Schaafsma's (1971) Southern San Rafael Zone); there are also linked figures which Schaafsma (1971:138) sees as an Anasazi element present in some Fremont Panels. With the exception of the anthropomorph in Panel 5 (of somewhat questionable antiquity) the remainder of the figures at 5MN439 fit the more general Uncompahgre-like pattern. Site 5MN443 is without question the most intricate and interesting of the petroglyph sites recorded. Not only does it contain far more figures and panels than any of the other sites, but also the only clear evidences of superimposition and the broadest cultural possibilities. The chain of 50 or more hand-holding figures (Fig. 29), amenable to either a Fremont or an Anasazi label, are covered by large anthropomorphs which tend toward the Fremont as well as unually stylized bear tracks and a sheep. Elsewhere (Fig. 27) sheep have been partially obliterated by other stylized "tracks". The two closest approximations to shield figures--"classic" Fremont elements (see Schaafsma 1971; Wormington 1955)--are also at this site (Fig. 26 and Fig. 27 lower) though either could be interpreted differently. One final element that could be associated with horticulturalists is the pair of "sandals" (Fig. 30b) similar to those found in the Glen Canyon (Turner 1963:58, 70).

In terms of distribution and of sheer numbers the figures discussed thus far represent a minority of the rock art present on the Dolores. Stress has been placed on the possibly "horticultural" art for what light it may shed upon the variety of adaptations present on the river. It might be considered disturbing that the rock art within the most definitely horticultural area of the canyon--that is, in the vicinity of the proposed McPhee Dam--does not contain the horticultural anthropomorphs. However, rock art in that area is scarce, and a case can be made for most of it being late to historic (i.e., non-Pueblo); (see below "Historic Figures"). Further, the rock available is not conducive to preservation of figures. As noted, much rock art in the Southwest is generally similar; a discussion of several more common motifs in this genre present on the Dolores follows.

"Other" anthropomorphs. In the vicinity of Big Gypsum Valley and in the Serpentine Canyon below there are several (at least nine) anthropomorphs which are fairly unique. They have generally elongated narrow bodies (some are stick figures), round, horned heads some with eyes and mouths, parallel, rake-like toes and fingers, and are, with two exceptions, decidedly phallic (Fig. 16). Anthropomorphs are not abundant at sites other than the Roc Creek, La Sal Creek, and Big Gypsum Valley figures discussed above. Human-shaped figures presumed to be Anasazi and probably supernatural occur at 5MT2214 (Breternitz and Martin 1973) in Beaver Creek Canyon near McPhee, well within the Anasazi area (Fig. 1). Another possibly super-natural figure is located at 42GR584 (Fig. 36) at the mouth of Beaver Creek, Utah; it is expectedly very different from the 5MT2214 figures and seems unusual in general terms as well. One simple, small human form is present at 5ME168 as are two at 5MN72. The four figures at 5ME175 (Fig. 35) are perhaps most similar to the Big Gypsum vicinity figures.

Quadrupeds (non-historic). In the neighborhood of 116 quadrupeds were recorded in 1975. Of these 52 may reasonably be called mountain sheep, primarily on the basis of curving horns. Fifty-seven quadrupeds either lack heads or are unassignable as there is some question as to whether they might be deer or sheep; three have antlers and can thus be called deer or elk. Four are non-ungulates--perhaps dogs or bears. Martineau (1973) argues that what are being called sheep here are in fact universal picture writing signs, partly because, judging from current big horn populations, they could not have been major food items. In this regard it is interesting to note that sheep comprised up to 90 percent of the faunal remains in Paradox Valley tests (Leach and Lippold 1973:17) and outnumber deer remains 7:1 in the Glen Canyon (Jennings 1966:22). Sheep are found to outnumber other animal forms in rock art in most other areas as well (Glen Canyon, Uncompahgre, eastern Utah). A majority of the quadrupeds on the Dolores would be classified by Buckles (1971:1105-15) as "Style 2" because of their inanimate stances though some would be "Style 3", which he considers earliest on relative grounds.

Tracks. According to Grant (1967) bear tracks occur in most parts of North America where rock art is found. Of the 18 sites with any form of rock art recorded since 1971, 12 have "bear" tracks. As noted by Huscher (1939) and Huscher and Huscher (1940) a wide variety of shapes and degree of stylization is observable in the track motif. Some called bear tracks here could be considered human. Muscher (1939:25) states that all bear tracks have the toes pointing up. At 5MN443 (Fig. 28) and 5ME168 (Fig. 33), however, there are at least two pairs with toes down. A problem noted by the Woodburys as early as 1932 (p. 13) is that of recent imitations. There is some question whether the freshness of pecking of some figures at both 5MN443 and 5ME168 is the result of imitation or an attempt to bring out genuine figures. At least one pair of toes-down tracks at 5ME168 appears to be recent; another pair at the same site looks older, as does the pair at 5MN443.

Deer or sheep tracks are less frequent than bear tracks but are nevertheless common throughout the area. Possible "turkey tracks" occur only at 5MN440A.

The geometrically stylized foot (with matching hand) at 5MN443 (Fig. 27) is similar to two or three such figures from Big Gypsum Valley (5SM14, Fig. 17). While they do not appear to be common a number of similar shapes (some are painted, not pecked) are present in the literature, interesting for their distribution and possible affiliations. Schaafsma (1963:47) figures one of "probable Navajo origin" from the Navajo Reservoir District; Grant (1967:56) shows a pair from Canyonlands; and Turner (1963:72) assigns a pair from the Glen Canyon to either Style 3 or 4 (PII-PIII).

<u>Long sinuous lines</u> (also "curvilinear meander" Schaafsma 1971:26). Lines up to five meters long winding their way across panels or isolated are common

but very little discussed. Many look a great deal like maps, a feeling reinforced by Turner's informant's statement (1963:71):

> "waterplace or whatever is good there. Maybe drawing of canyon. Wherever trail comes to there it directs them."

Examples from the Dolores may be seen at 5SM45 (Fig. 15), 5SM10 (Fig. 16), 5MN439 (Figs. 18, 20, 21), 5MN443 (Figs. 27, 28), and 5ME175 (Fig. 34). Examples from the literature are: Glen Canyon--Turner (1963:63, Figs. 63-68; p. 68, Fig. 85; p. 71, Fig. 98), east flank Uncompahgre Plateau--Buckles (1971:1081, 1090, 1093), and eastern Utah--Schaafsma (1971:36, 47).

Abstract and miscellaneous. There is less recurrence of motifs in this lumped category than in the above listed varieties. Some recognizable figures that occur more than once on the Dolores are briefly catalogued below:

(1). Fringed line. (Turner 1963:3) or rake (Schaafsma 1971:26). Here a series of parallel straight lines which are perpendicular to a single line, sometimes crossing the latter sometimes terminating at it. There are nine occurrences overall: 5MT2214 (Breternitz and Martin 1973), 5MT2405 and 2414 (Toll 1974), 5SM9 and 5MN72 (Breternitz 1971), 5MN439 (Fig. 18), 5MN443 (Figs. 24, 28). Those at 5SM9 and 5MN72 are similar in having wavy lines added and further elaboration above the intersection of the perpendicular lines. 5MT2405 and 2414 and 5ME165 are further discussed in the historic figure section.

(2). Quartered or bisected circle. Four such figures were found: 5SM45 (Fig. 15), 5MN439 (Figs. 18, 20), 5ME168 (Fig. 33).

(3). "Sun disc" (Schaafsma 1971:26). Variations on this theme includes dots in the center and elaboration of the "rays". Examples are found at 5MN443 (Figs. 23a, 26, and possibly 27) and 5ME175 (Fig. 35).

(4). Concentric half circles. A ready analogy for the two occurrences--5MN439 (Fig. 20) and 5MN443 (Fig. 24)--is a rainbow.

(5). Spirals ("watch spring scrolls"). Only two such figures have been recorded; the frequency of spirals and concentric circles is apparently much higher in the Anasazi area (Turner 1963). A plain example is at 5MN439 (Fig. 18); at 42GR584 (Fig. 36) the spiral is attached to a bear track.

(6). Open ovals. The shape of the two instances of slightly squared ovals is somewhat reminiscent of "sandals". At 5MN443 (Fig. 29) one has been carefully superimposed on the connected arms of several human figures; the second occurrence is at 42GR584 (Fig. 36).

<u>Aboriginal figures of the historic period</u>. Buckles (1971:1065-1084) reports a number of historic figures defined primarily by the presence of horses. He divides the historic art into an early and a late style, and estimates 1830 to be a rough date of transition between the styles. Both are characterized by incising, abrading, and grinding, and linearity though the late

style shows more realistic detail. Two sites on the Dolores have horses--5MT2414 (Toll 1974) and 5ME165 (Fig. 31). Both examples conform to Buckles' early style, as do the bison at 5ME165. The technique of carving at both sites is also within the range he specifies. No recognizably historic material was associated with either panel. The figures at 5ME165 appear to be quite fresh (not to mention their proximity to Colorado 141) and it should be remembered that Buckles' classification is totally stylistic. Further, the Utes were not officially "removed" from the area until 1880 (Huscher and Huscher 1940) and continued to use the canyons and vicinity until 1882 (Brüyn 1955:79-80).

Though both lack horses or other identifiably historic elements sites 5MT2404 (Toll 1974) and 5MN440A (Fig. 22) are conceivably associable with the historic style on the grounds of similarity of technique and content. 5MT2405 is near 5MT2414, contains similar figures including no recognizable Anasazi elements; the scant associated material does not include Anasazi ceramic or other artifacts. 5MN440A is less similar in technique, consisting almost entirely of very fine, incised lines. While it does resemble historic panels more than the non-historic, it is perhaps best to consider it unique rather than historic.

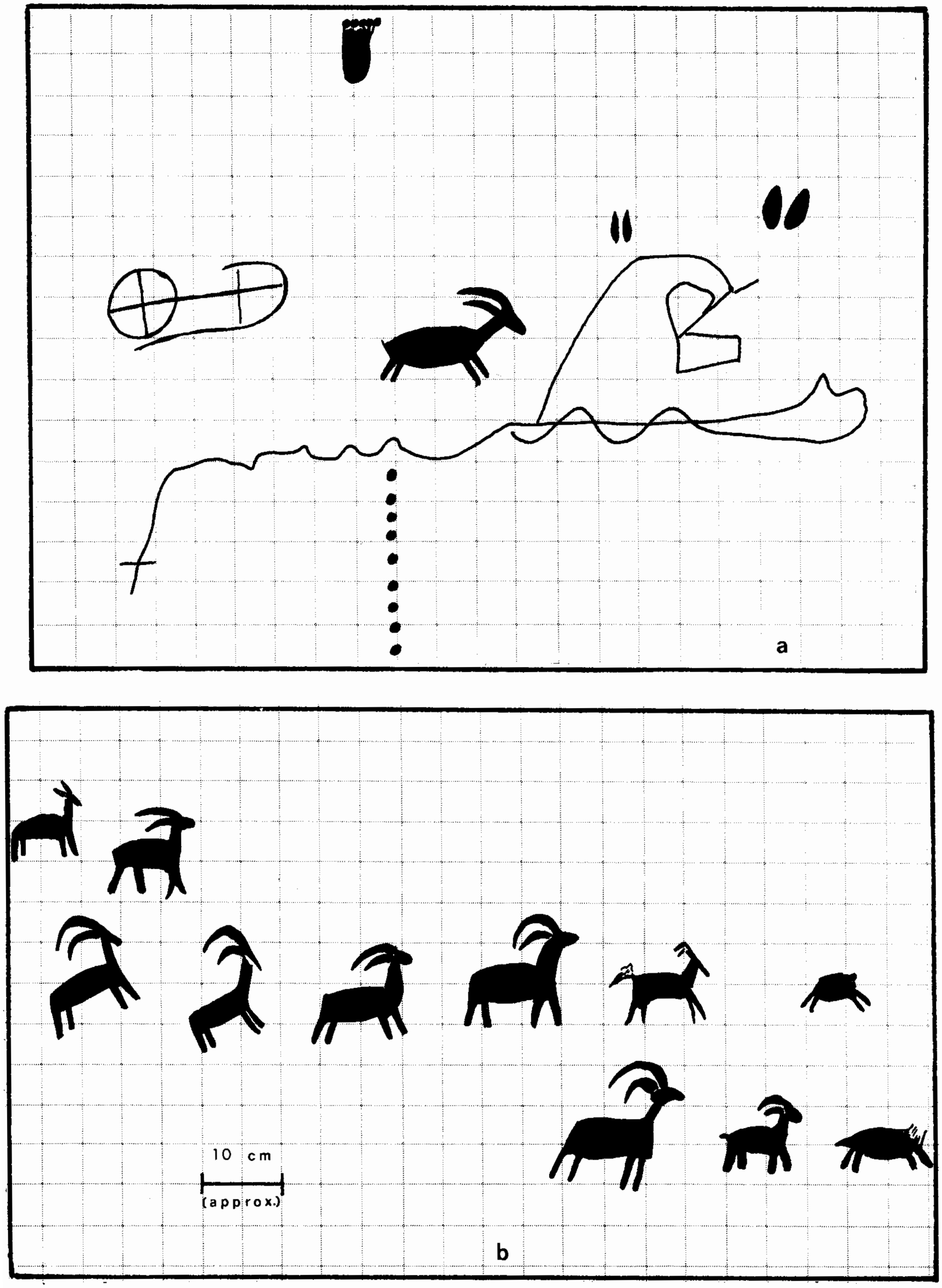


Figure 15. Petroglyphs at 5SM45. a, Panel 1 with two sheep not shown; panel measures approximately 2 x 2 m with all figures pecked; located well above ground surface. b, Panel 2, about 1.0 x 0.6 m beginning near ground surface; figures are pecked into blackened rock face.

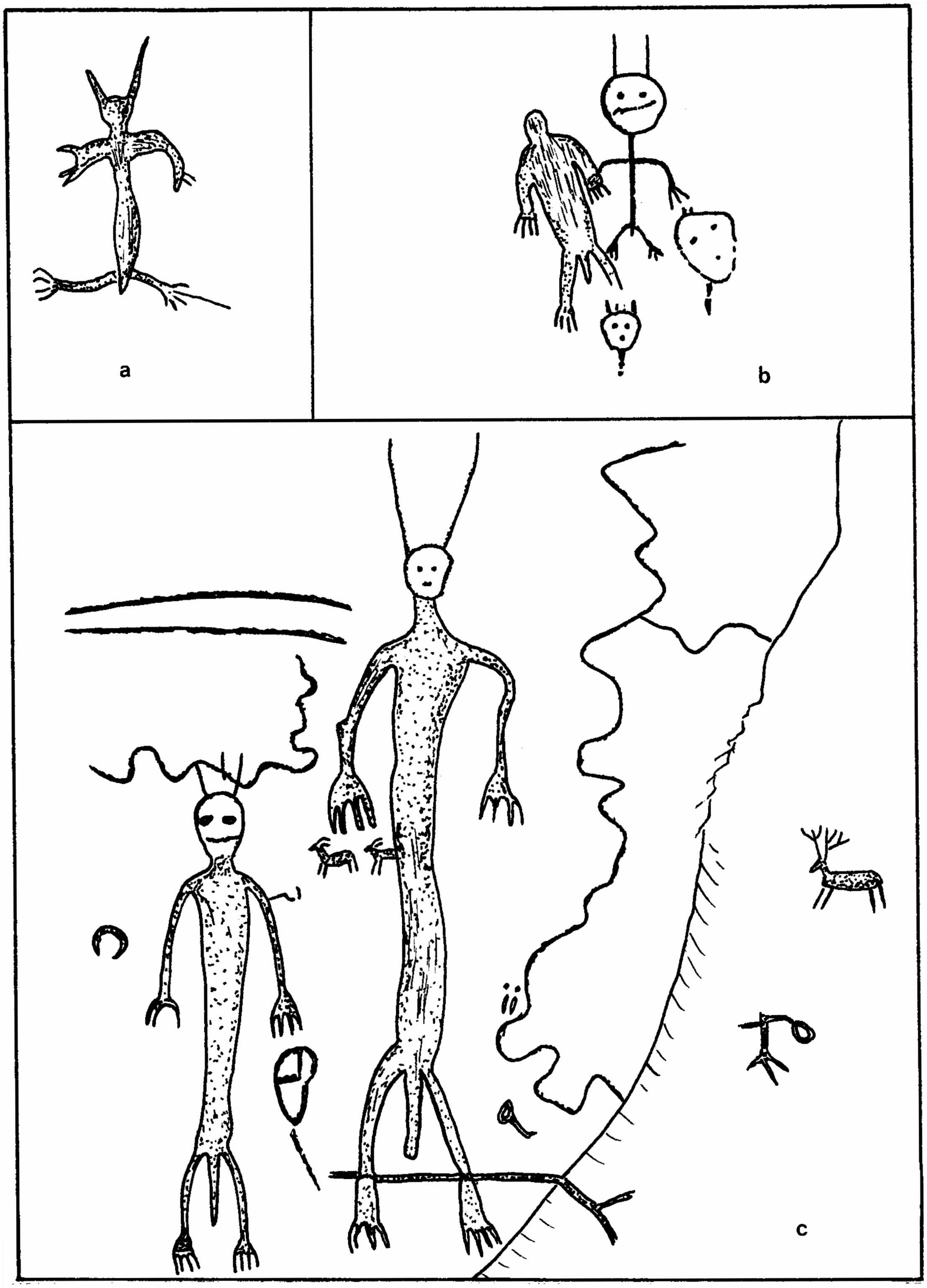


Figure 16. Rock art in Big Gypsum Valley. a, easternmost figure at 5SM9; b, westernmost figures at 5SM9 (sizes unknown); c, looking north at 5SM10 panel, which is approximately 1.9 m high by 2.5 m. All panels are mostly pecked with some abrading. From photos in Breternitz (1971).

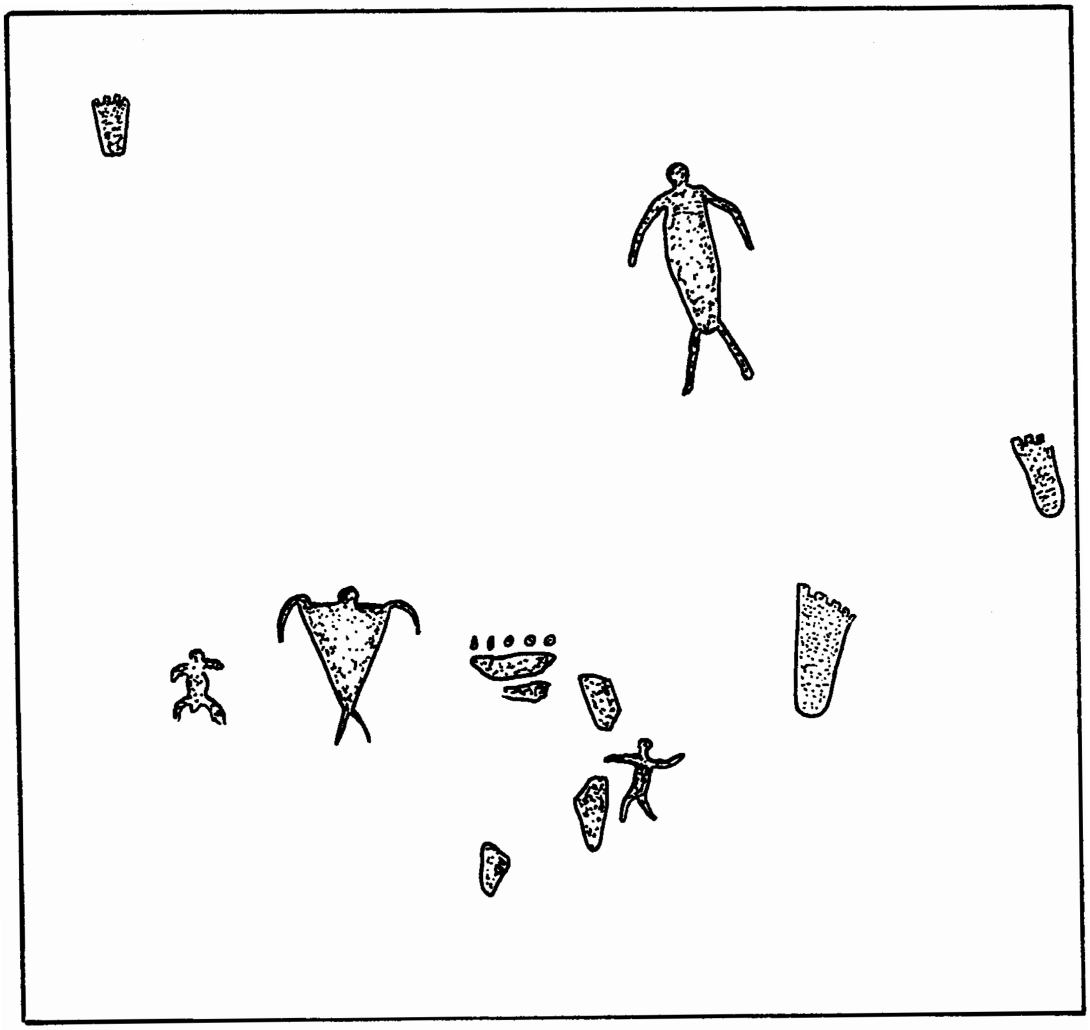


Figure 17. Rock art in Big Gypsum Valley. Looking east at the panel at 5SM14, which is located on a large boulder. The panel measures about 1.2 m high by 1.9 m; all figures are pecked. Note especially the triangular anthropomorph. From photo in Breternitz (1971).

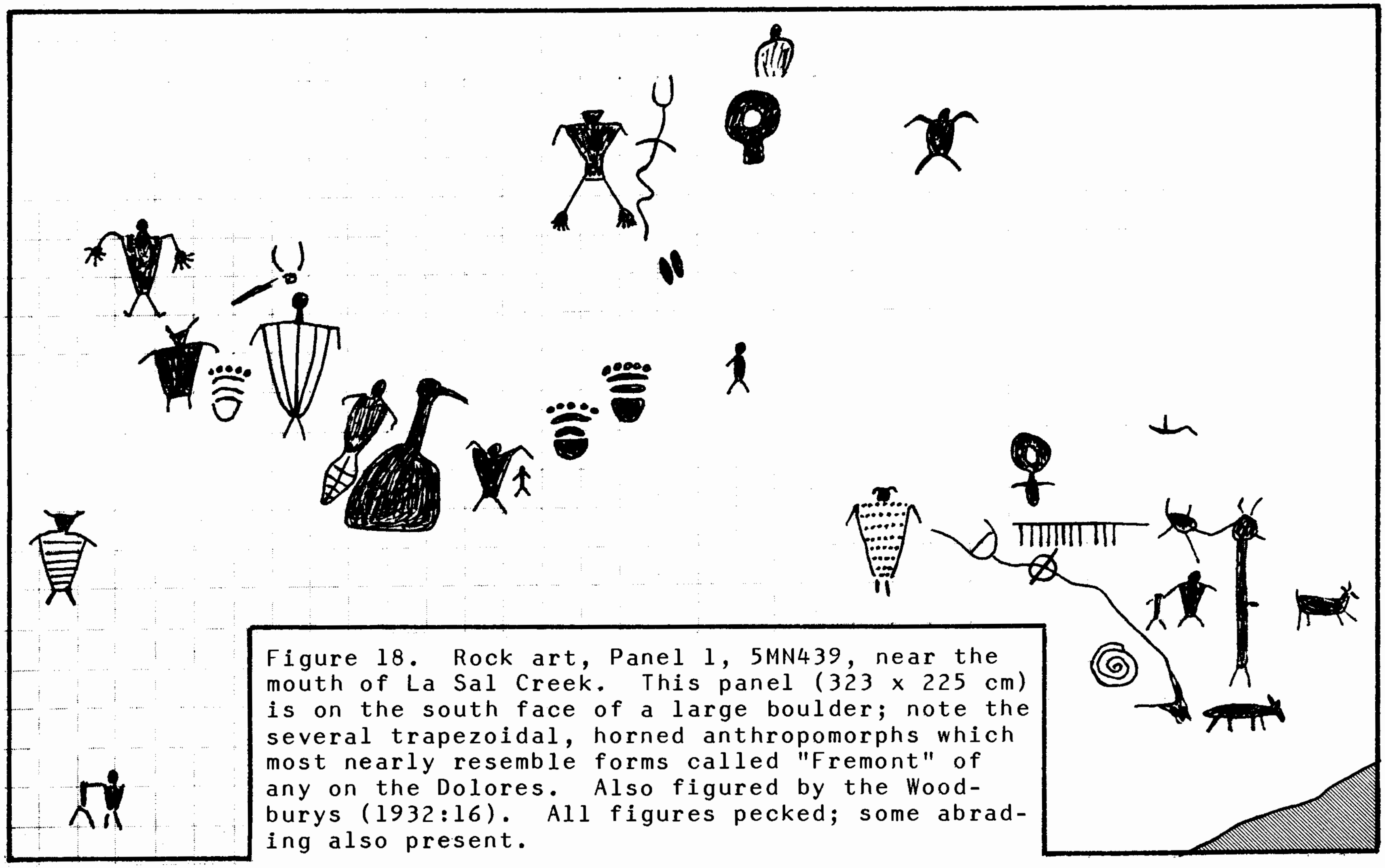


Figure 18. Rock art, Panel 1, 5MN439, near the mouth of La Sal Creek. This panel (323 x 225 cm) is on the south face of a large boulder; note the several trapezoidal, horned anthropomorphs which most nearly resemble forms called "Fremont" of any on the Dolores. Also figured by the Woodburys (1932:16). All figures pecked; some abrading also present.

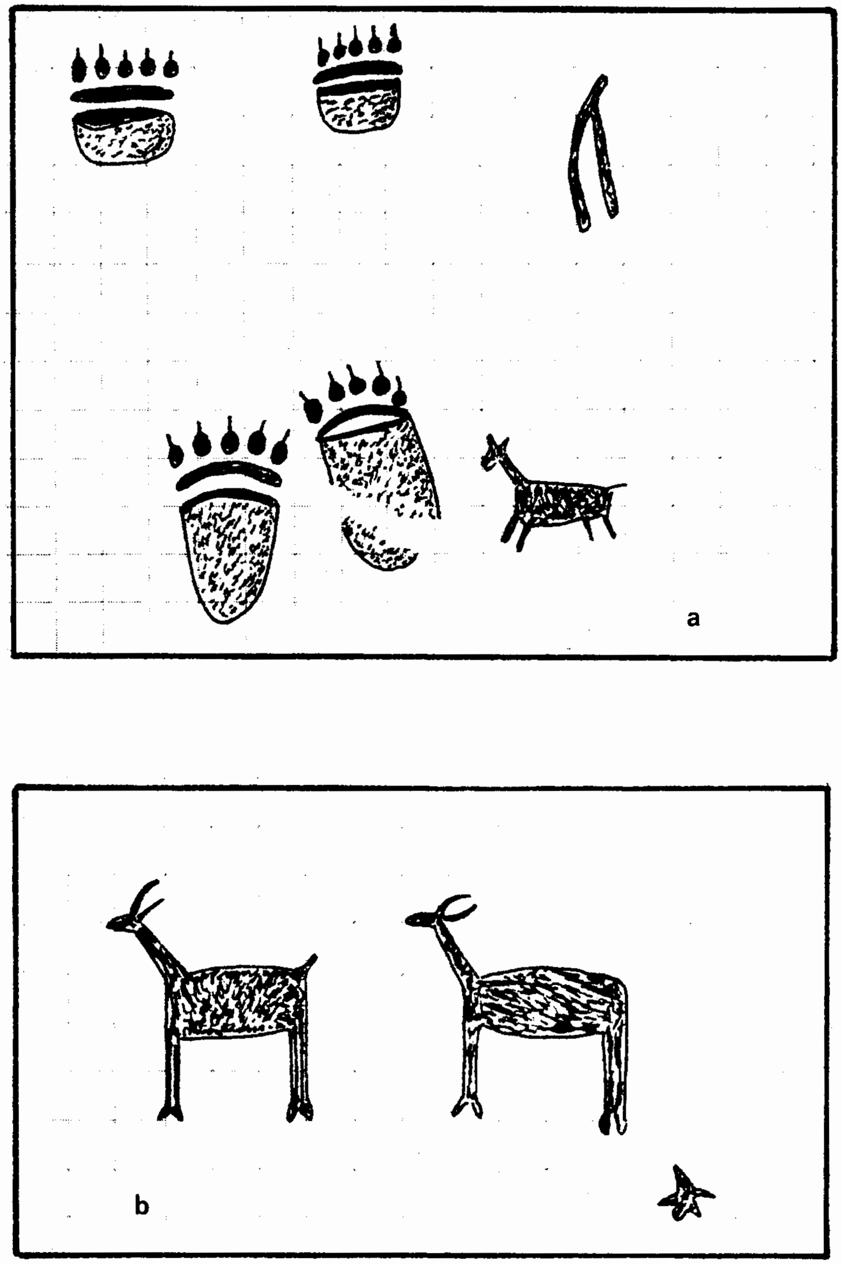


Figure 19. Rock art, 5MN439. Both panels are on different faces of the same boulder as Panel 1 (Fig. 18). a, Panel 2, pecked figures, overall measurement 60 x 65 cm; the lower tracks have desert varnish over part of them--Turner (1963) estimates such "patination" would take at least 1,000 years. b, Panel 3, pecked figures, 63 x 39 cm.

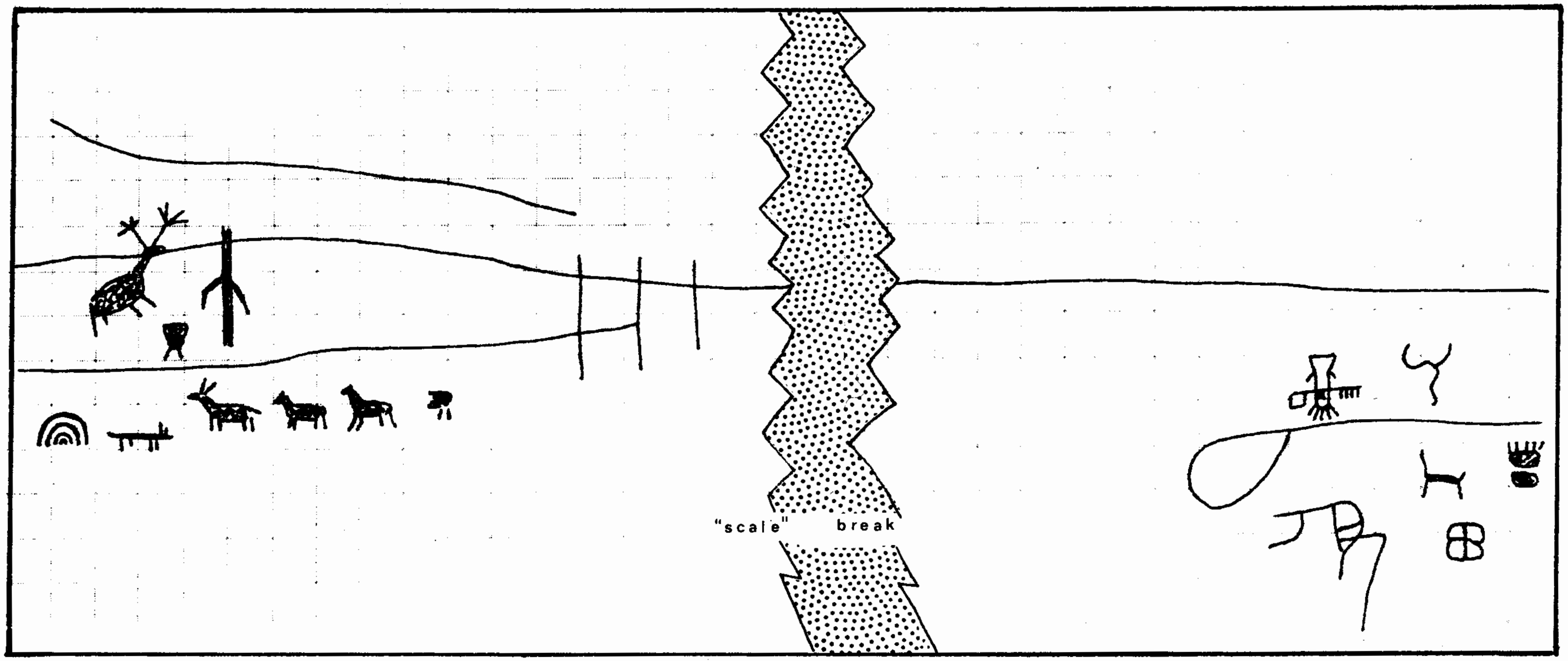
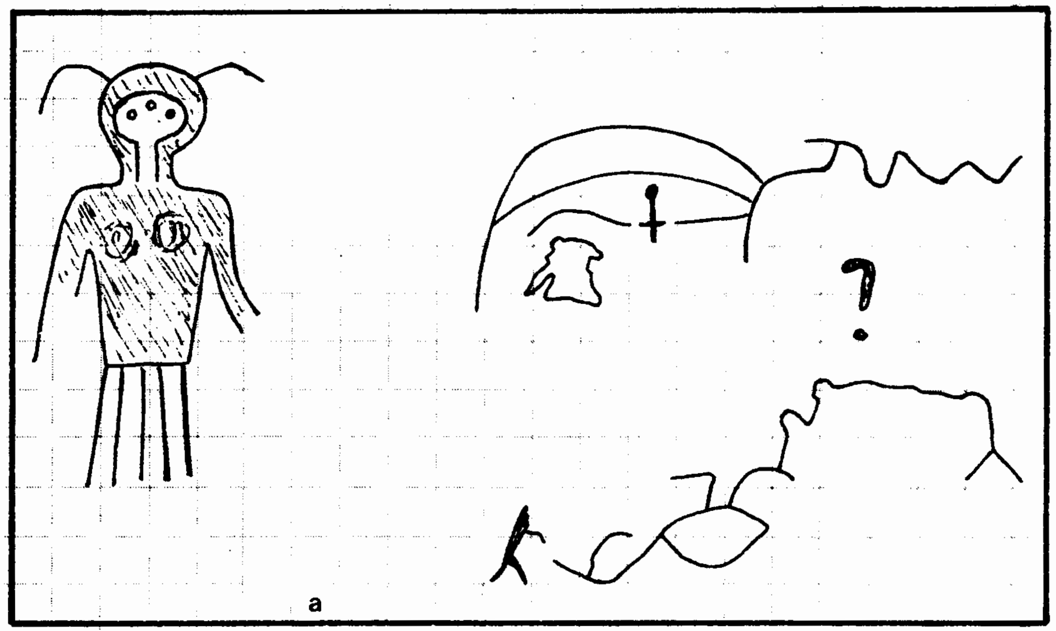


Figure 20. Rock art, Panel 4, 5MN439. This is a very long panel (574 x 110 cm) on the exposed and weathered west face of a large boulder near that with rock art shown in Figs. 18-19. The figures are pecked; the long straight line crosses the entire face of the boulder.



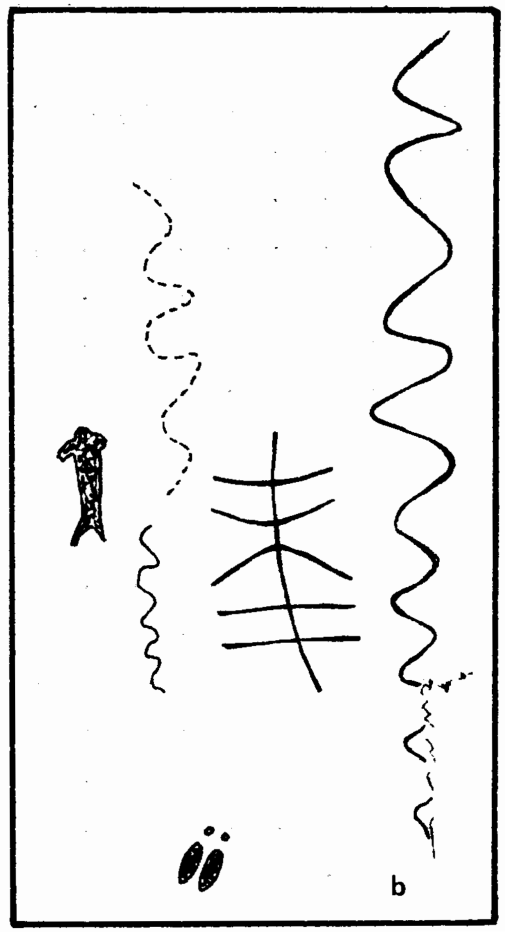


Figure 21. Petroglyphs, 5MN439. a, Panel 5 (89x 63 cm), east side of boulder on which Panel 4 is located; the anthropomorph is partly abraded and may be recent. b, Panel 6 (90 x 115 cm) located on an east face of a boulder near Panels 1-5. The dotted line at upper left may be a recent addition, as may the human figure.

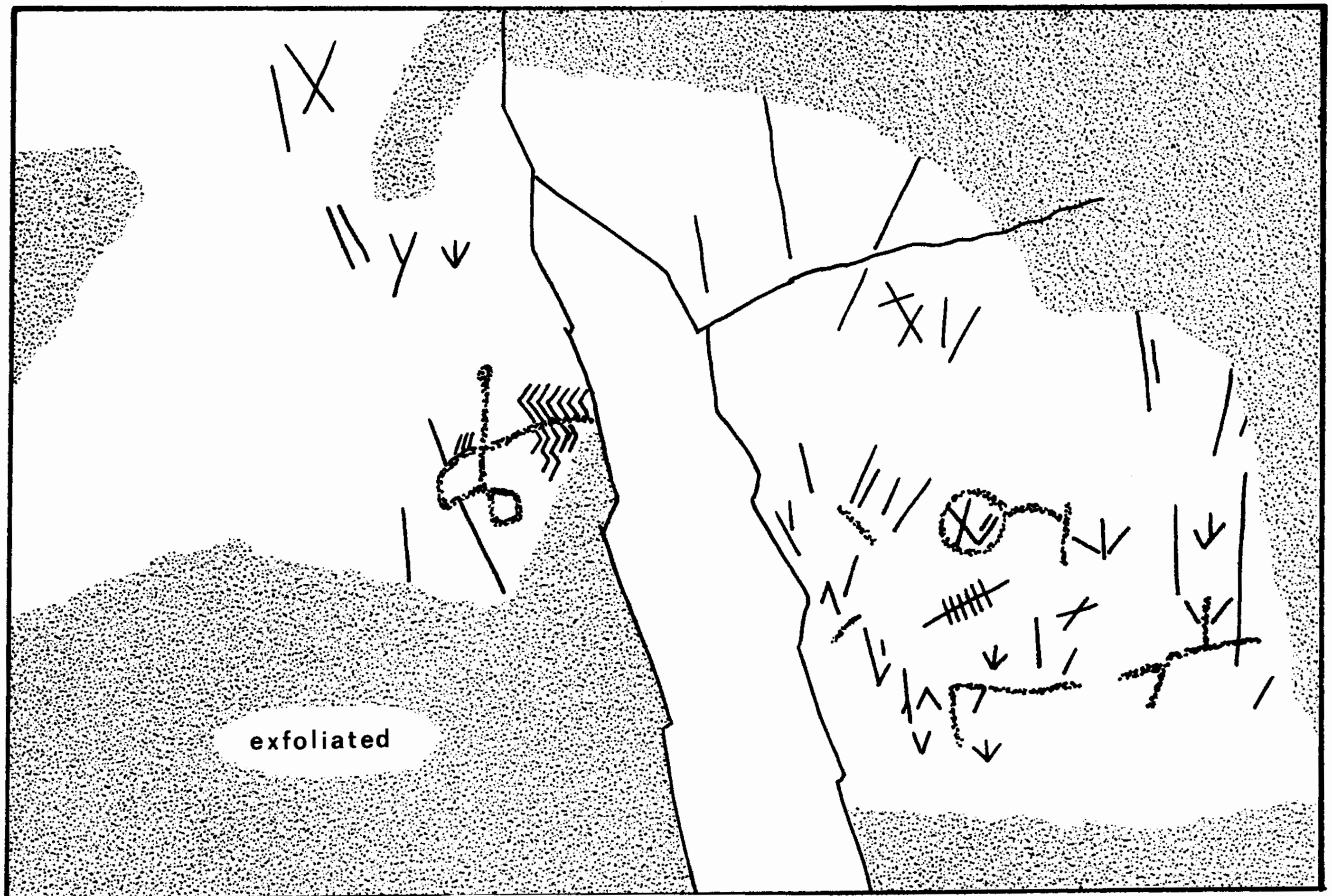


Figure 22. Rock art, 5MN440A. 95 x 143 cm panel consisting primarily of very finely incised lines with some apparent superimposition of pecked lines and areas; located in a shallow overhang. A large natural crack breaks the center of the panel and some lines are terminated by exfoliation of the wall.

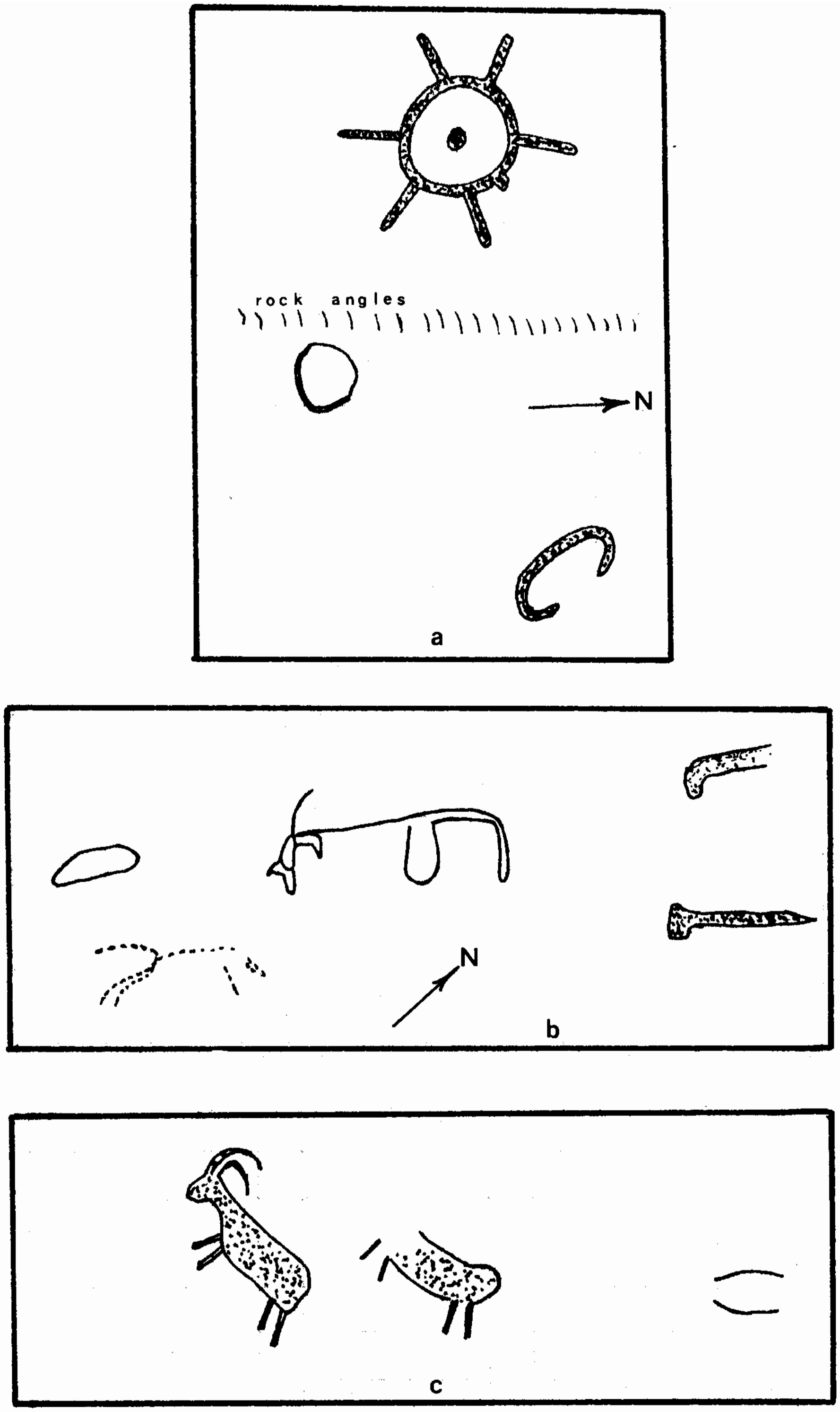


Figure 23. Rock art, 5MN443. a, Panel 1, 37 x 62 cm, pecked figures on smooth-surfaced rock lying on the ground; arrow indicates north. b, Panel 3, 38 x 72 cm, also pecked on a rock lying on the ground. c, Panel 4, 49 x 16 cm on cliff wall within the site's overhang.

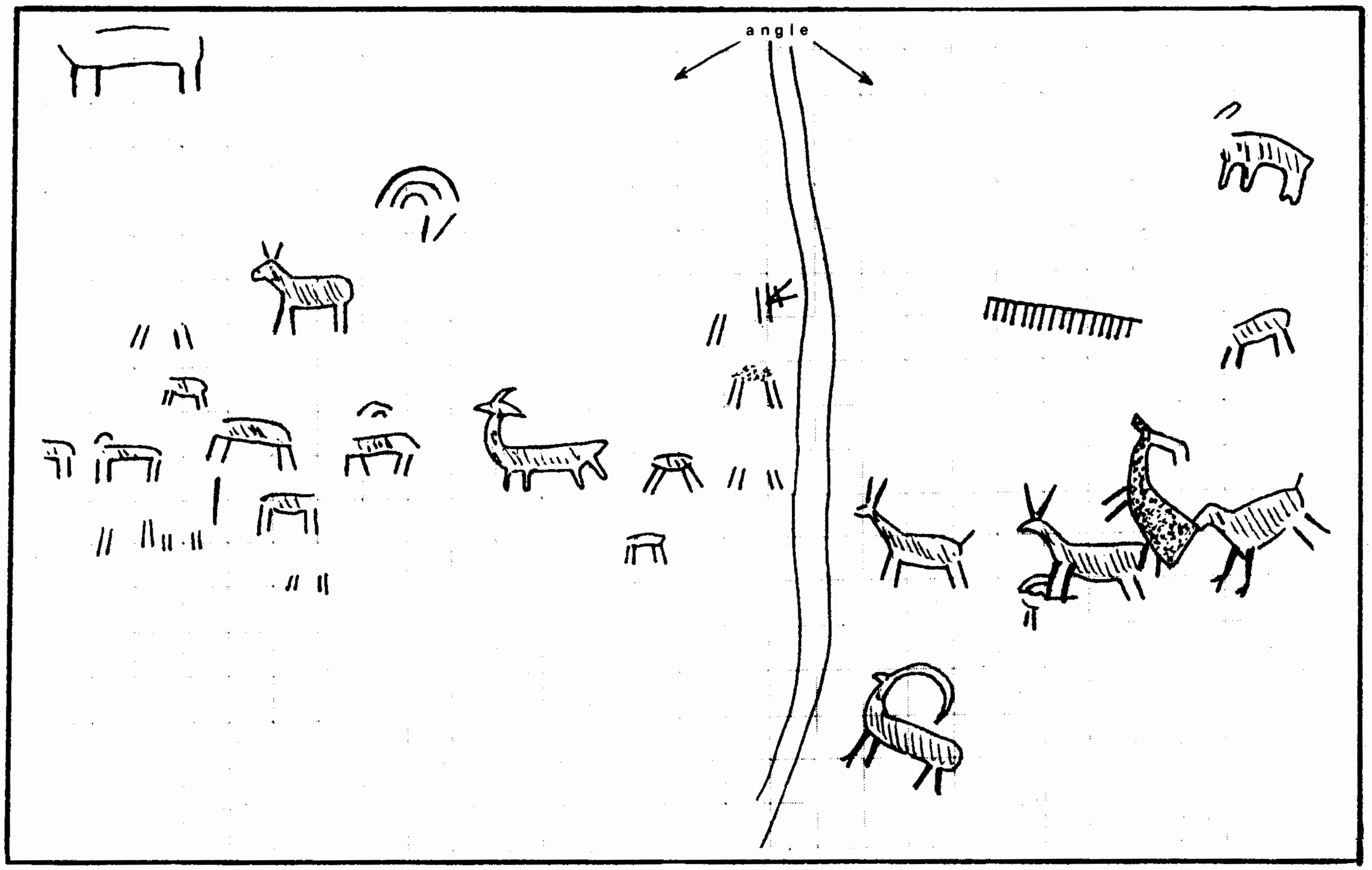


Figure 24. Rock art, 5MN443, Panel 2. This panel is on a sheltered cliff face just outside the site's overhang. Most of the figures are incised or abraded rather than pecked. The rock face angles near the middle of the panel and on the left side of the angle there are many pairs of parallel lines that may have had quadruped bodies (overall 175 x 71 cm, bottom of panel 170 cm above ground level).

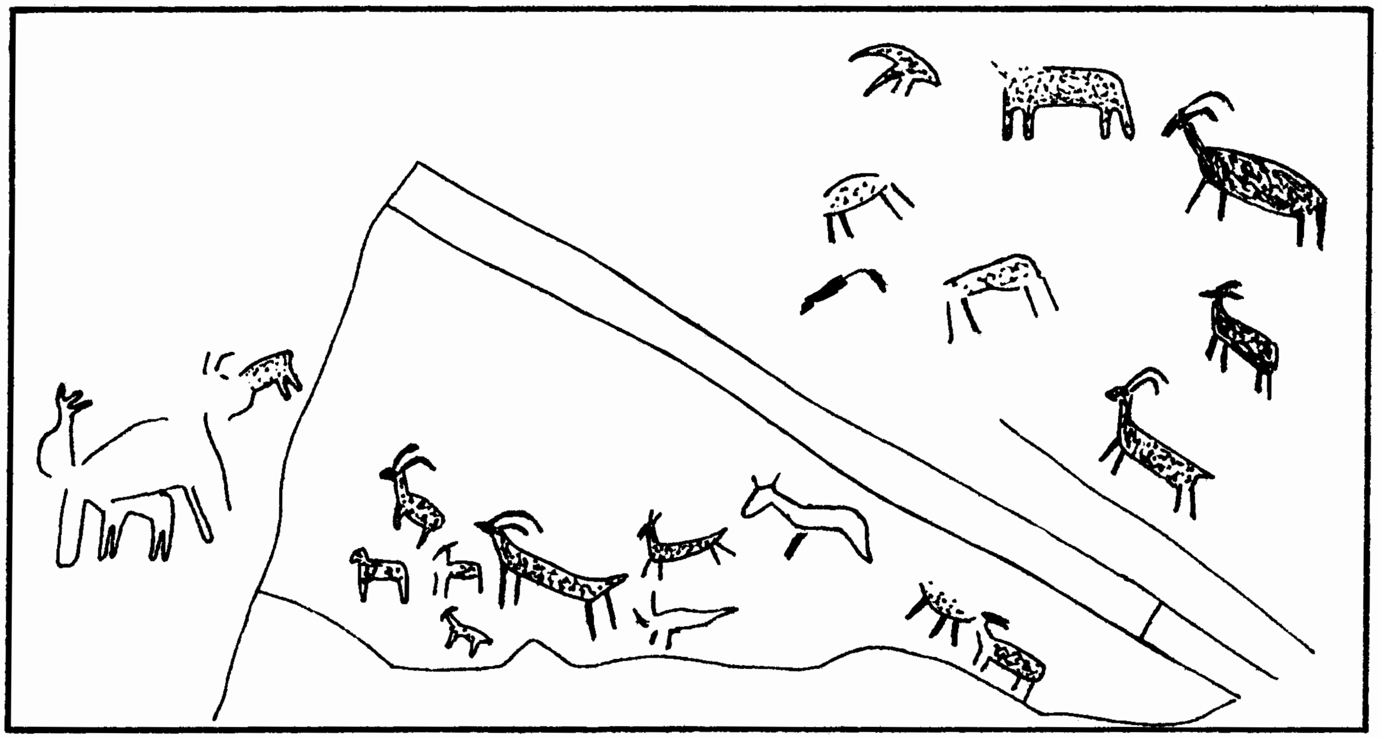
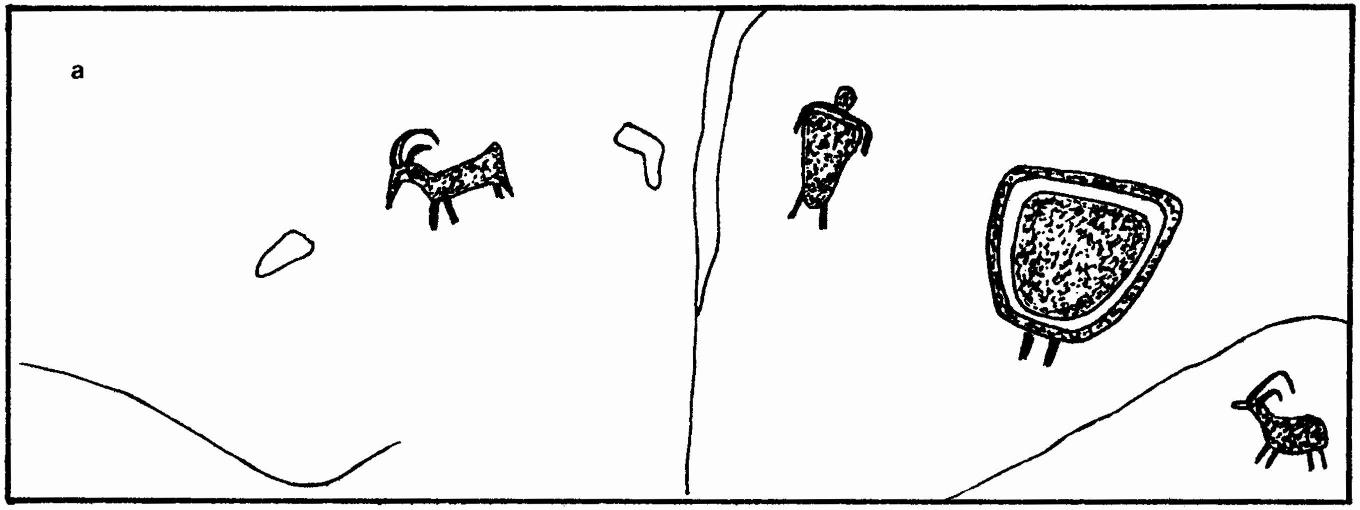


Figure 25. Petroglyphs, 5MN443, Panel 5. Figures are pecked, panel measures 188 x 70 cm; some fresh pecking is present, but it is apparently on top of authentic figures.



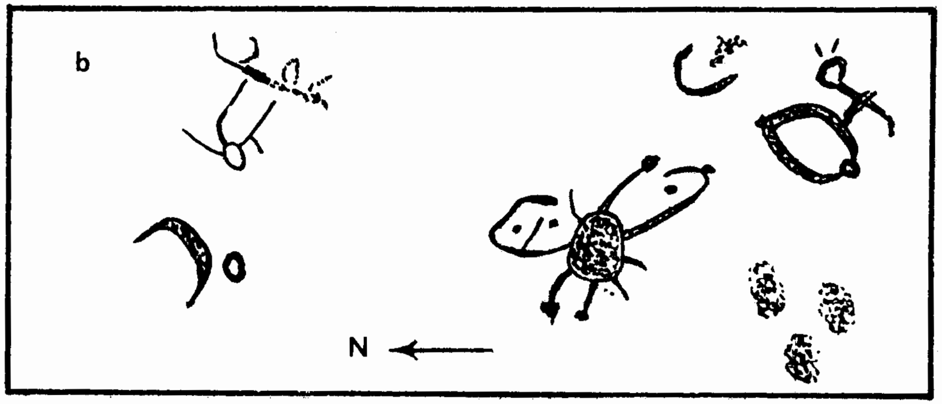


Figure 26. Rock art, 5MN443. a, Panel 6, 131 x 26 cm; figures are pecked, the sheep at lower right is very freshly pecked and may be a recent imitation. The rounded figure toward the right is somewhat reminiscent of a "shield figure". b, Panel 7, 50 x 79 cm on the very smooth face of a fall rock within the overhang. Figures are pecked, arrow indicates north and the back of the overhang.

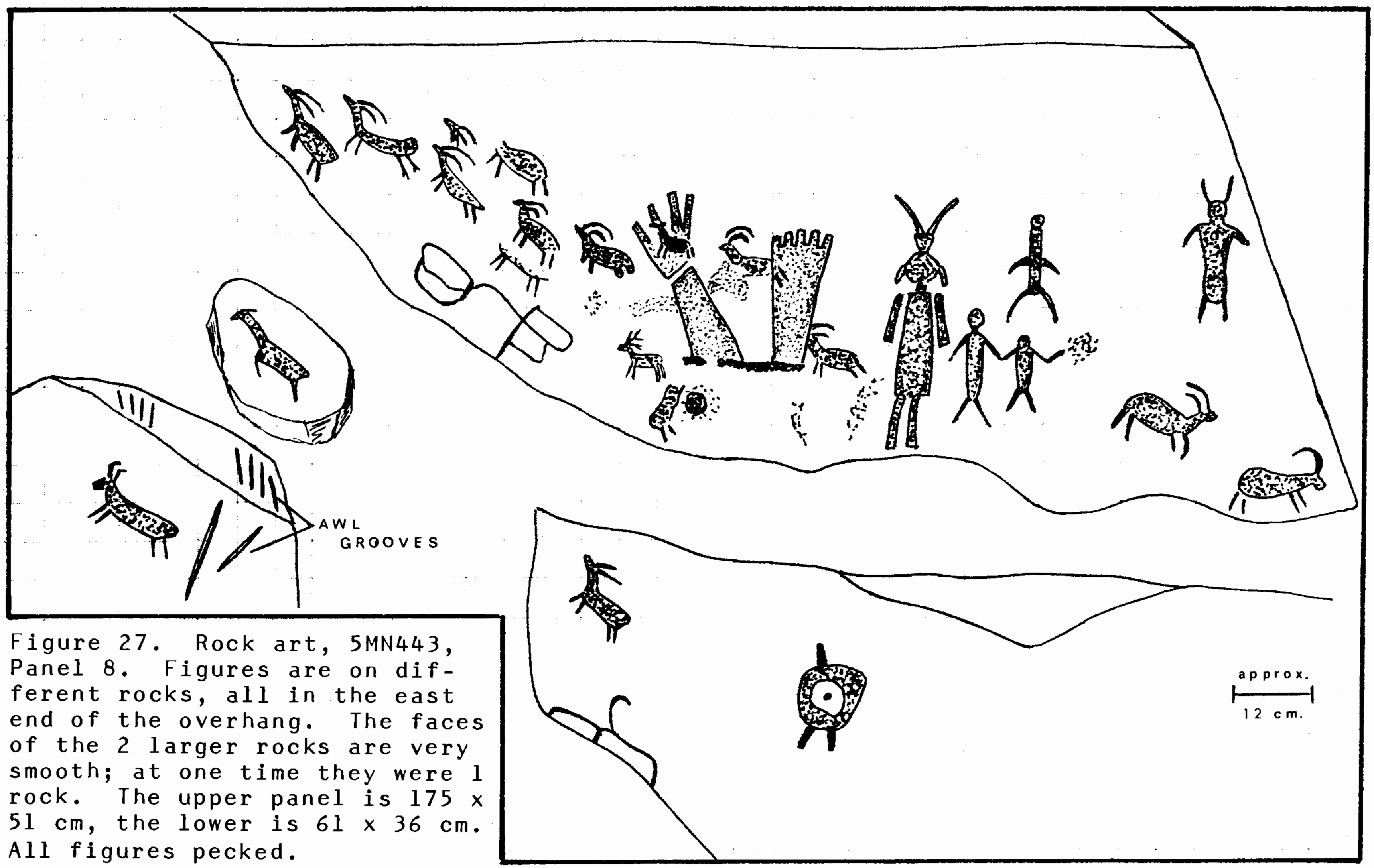


Figure 27. Rock art, 5MN443, Panel 8. Figures are on different rocks, all in the east end of the overhang. The faces of the 2 larger rocks are very smooth; at one time they were 1 rock. The upper panel is 175 x 51 cm, the lower is 61 x 36 cm. All figures pecked.

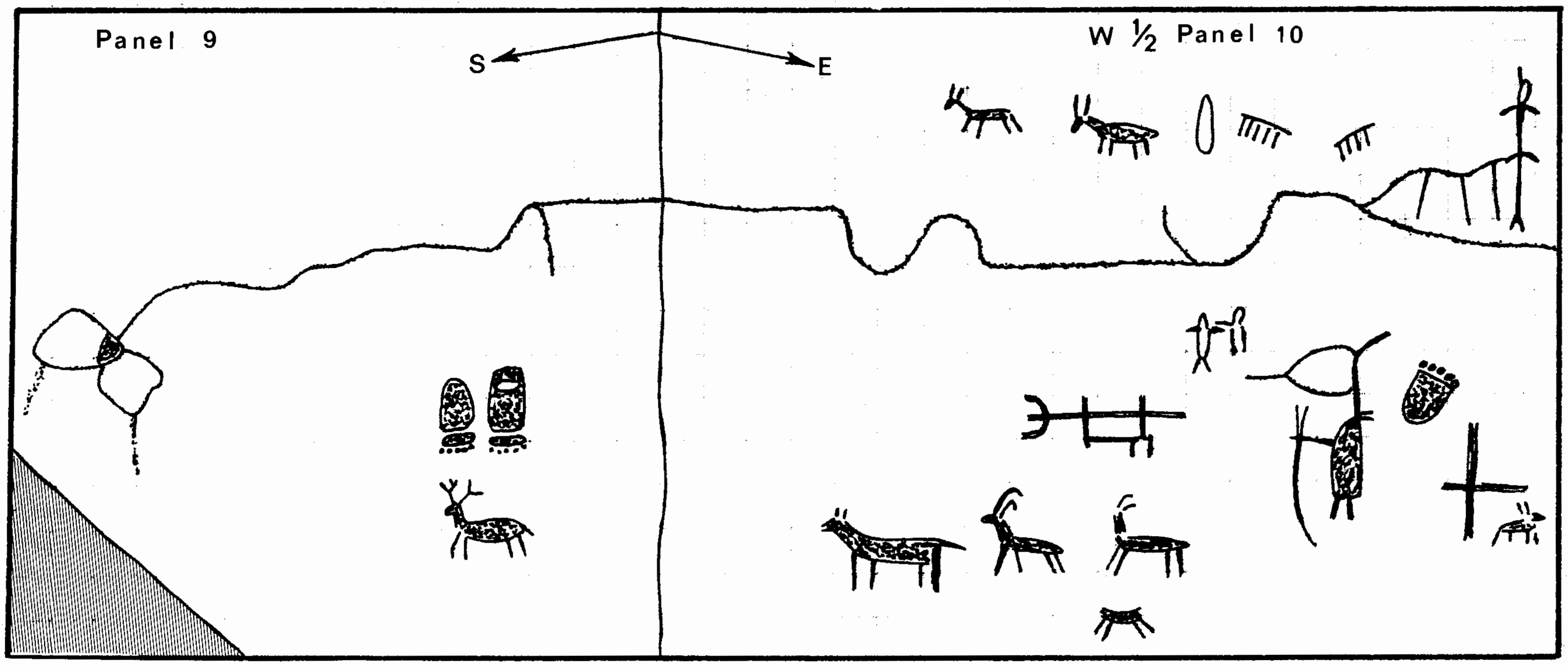


Figure 28. Rock art, 5MN443. Panel 9 and west half of Panel 10. Panel 9 measures 145 x 80 cm, all of Panel 10 is 412 x 142 cm. The panels are separated by a right angle joint in the cliff, as indicated by arrows. The map-like figure beginning at the left of Panel 9 extends across all of the west half of Panel 10 and into the east half (following figure) a distance of around 5.5m. Shaded area at lower left is the site's main overhang.

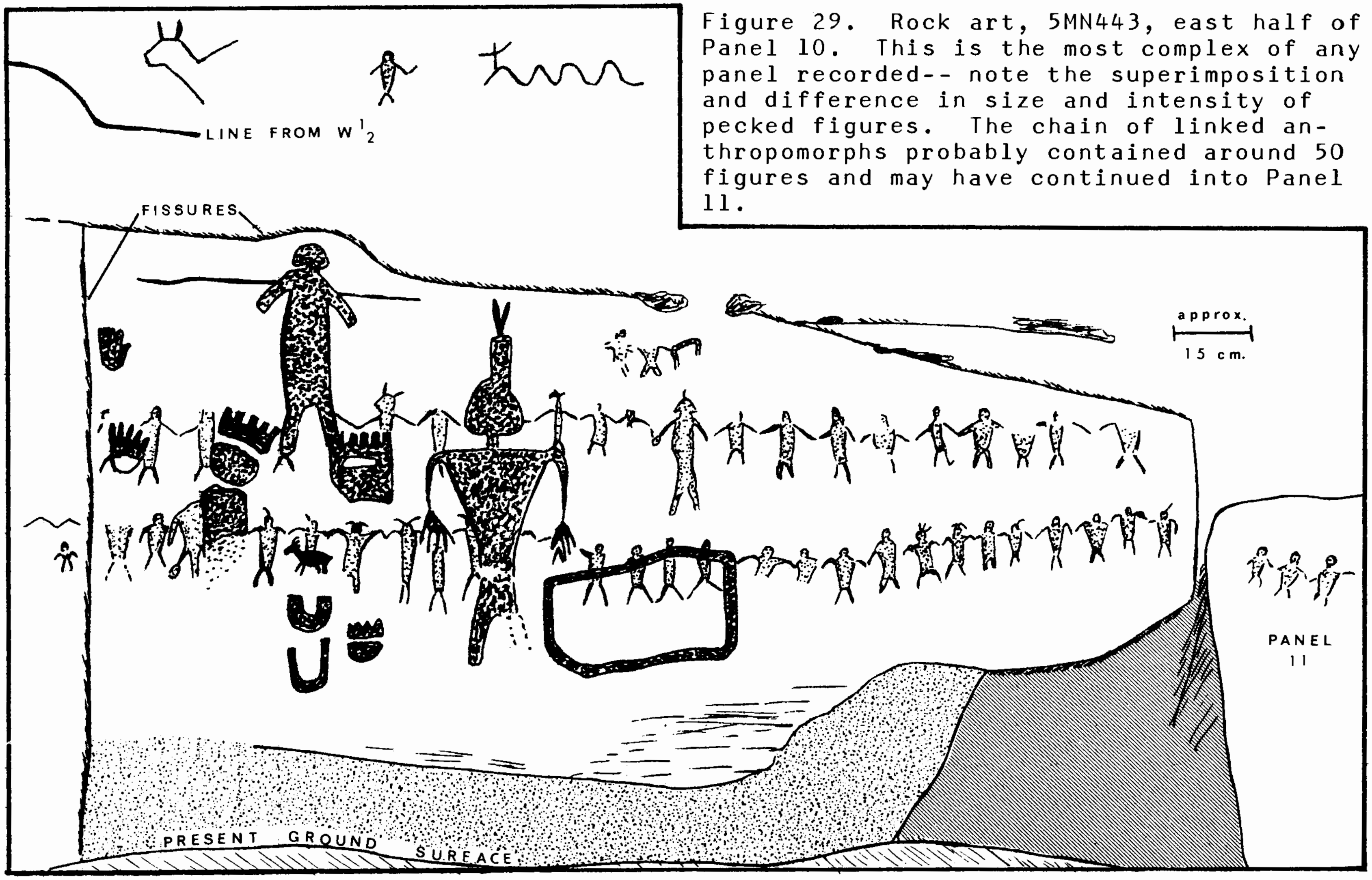
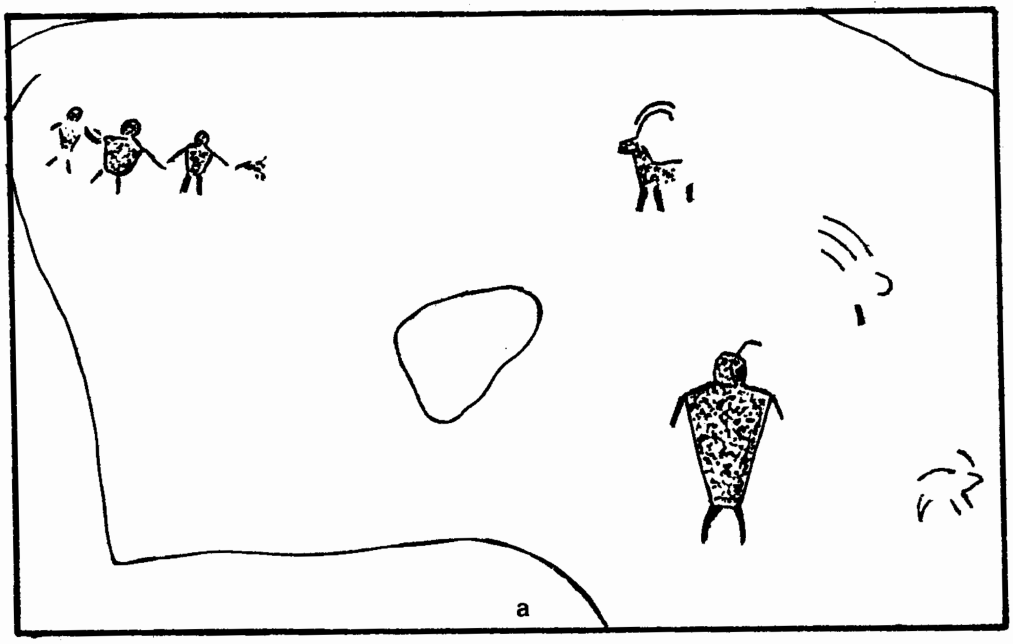


Figure 29. Rock art, 5MN443, east half of Panel 10. This is the most complex of any panel recorded-- note the superimposition and difference in size and intensity of pecked figures. The chain of linked anthropomorphs probably contained around 50 figures and may have continued into Panel 11.



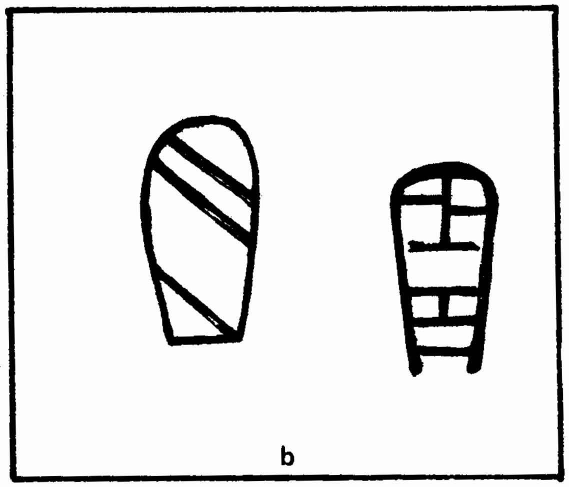


Figure 30. Rock art, 5MN443. a, Panel 11, 136 x 50 cm, located adjacent to Panel 10. Weathering of this panel is very heavy. b, Panel 12, 48 x 26 cm, the easternmost figures at the site, located in a small overhang. These figures are reminiscent of "sandals" from the Glen Canyon.

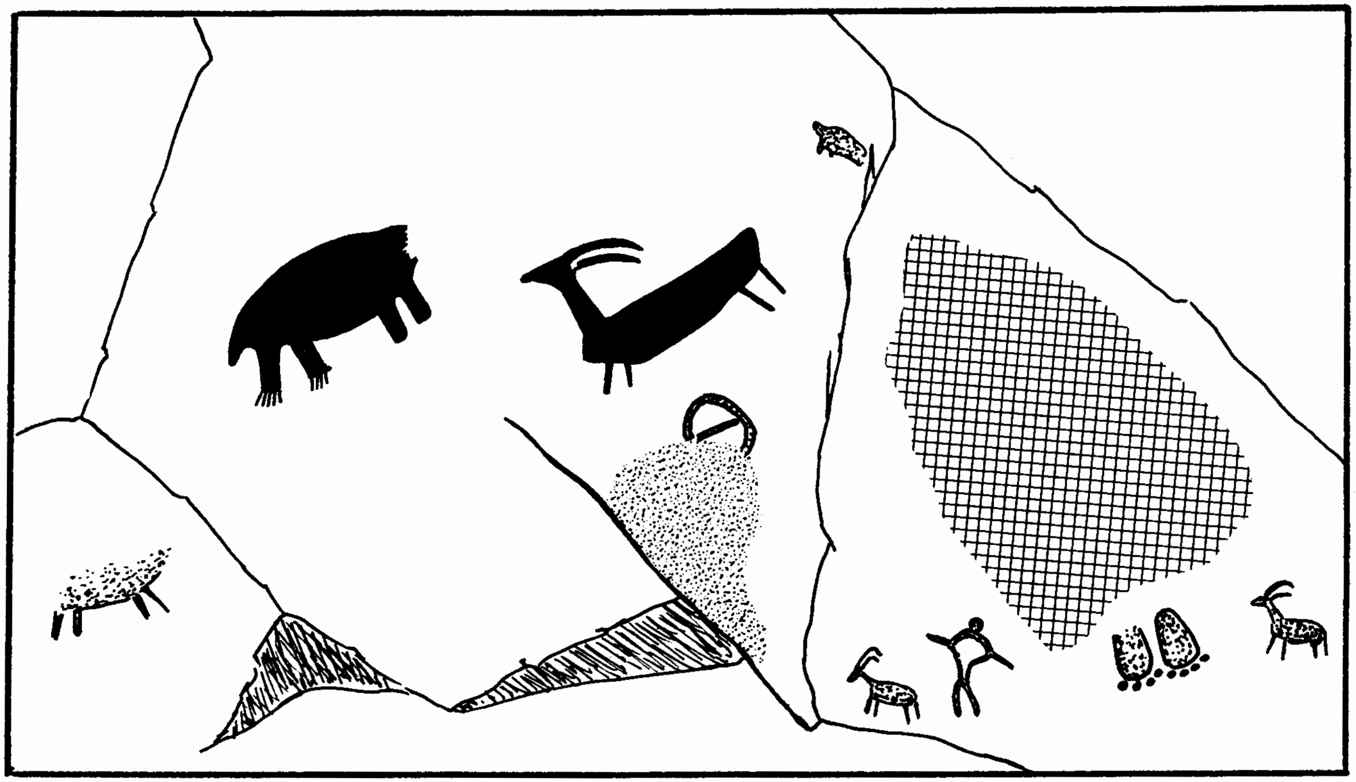


Figure 33. Rock art, 5ME168. This panel is located in an overhang under a boulder; some signs of occupation are present. The solid black figures are the only painted items recorded on the Dolores; the rest of the figures in this panel are pecked. The panel begins at ground surface; the large painted sheep is around 50 cm long. Cross-hatching indicates an area of very freshly pecked figures which may or may not follow authentic figures; some exfoliation also present, partially destroying bisected circle.

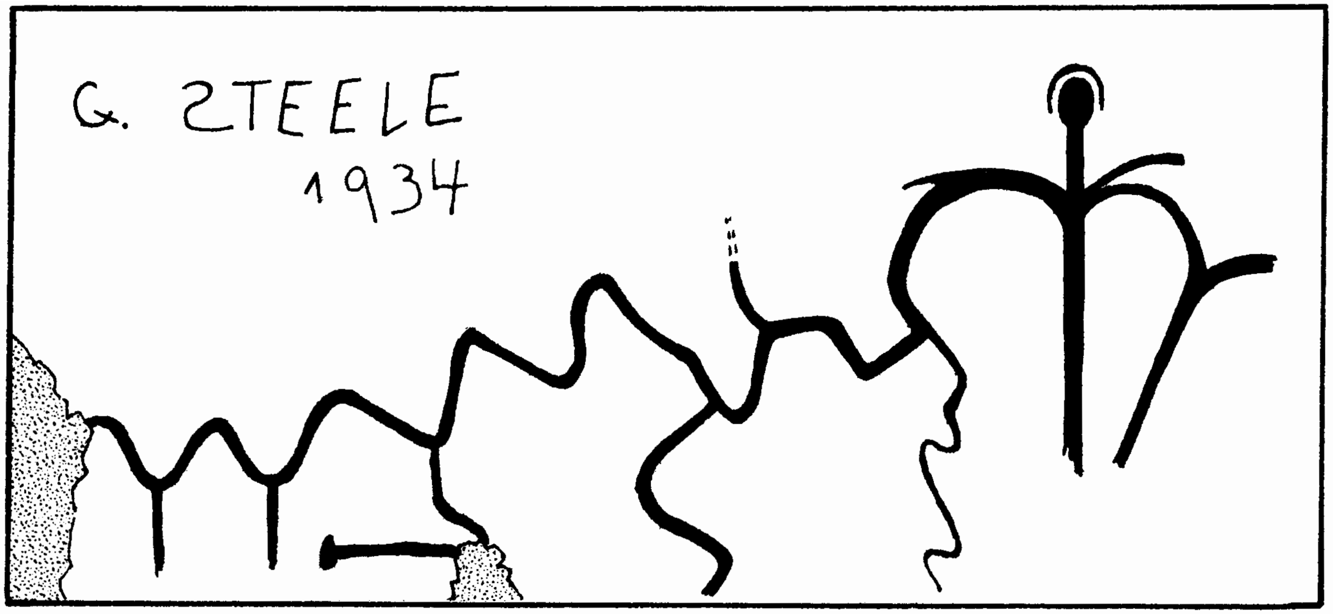


Figure 34. Rock art, west panel of 5ME175. The prehistoric portion of the panel measures about 60 x 120 cm, and is all pecked. Exfoliation has partially destroyed parts of this figure which is very "map-like".

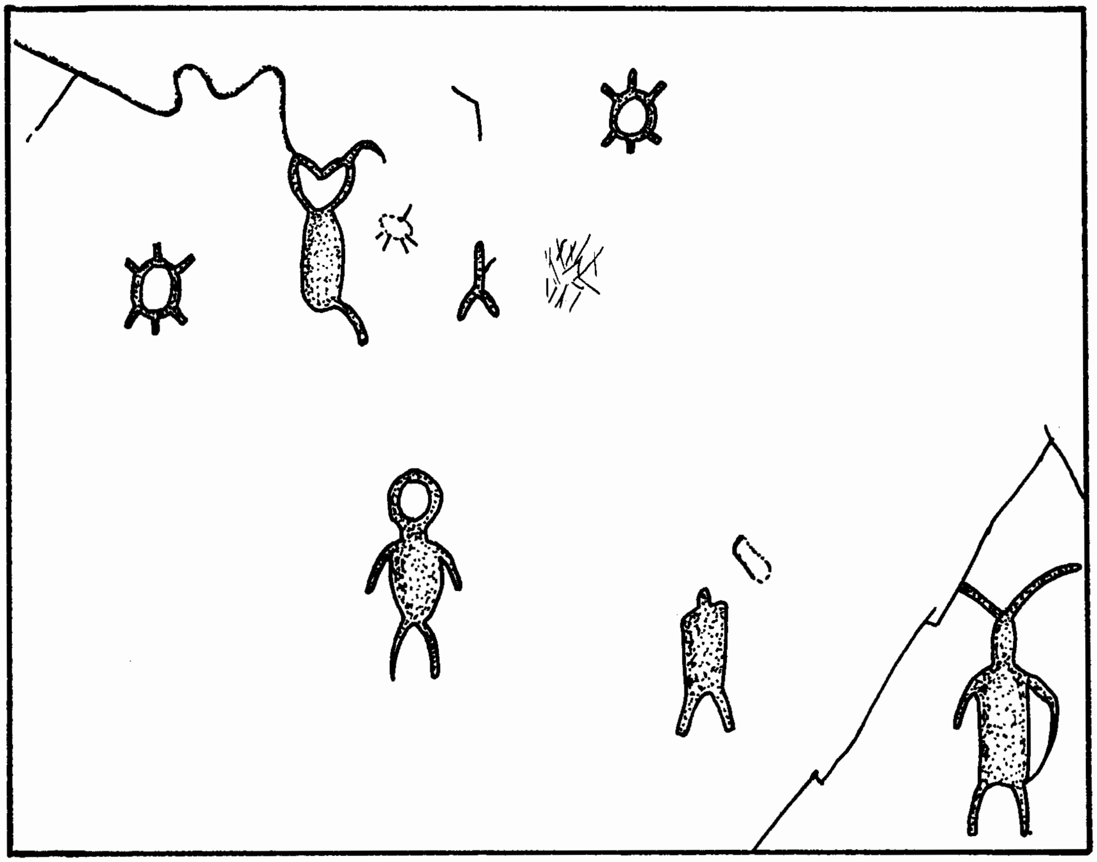
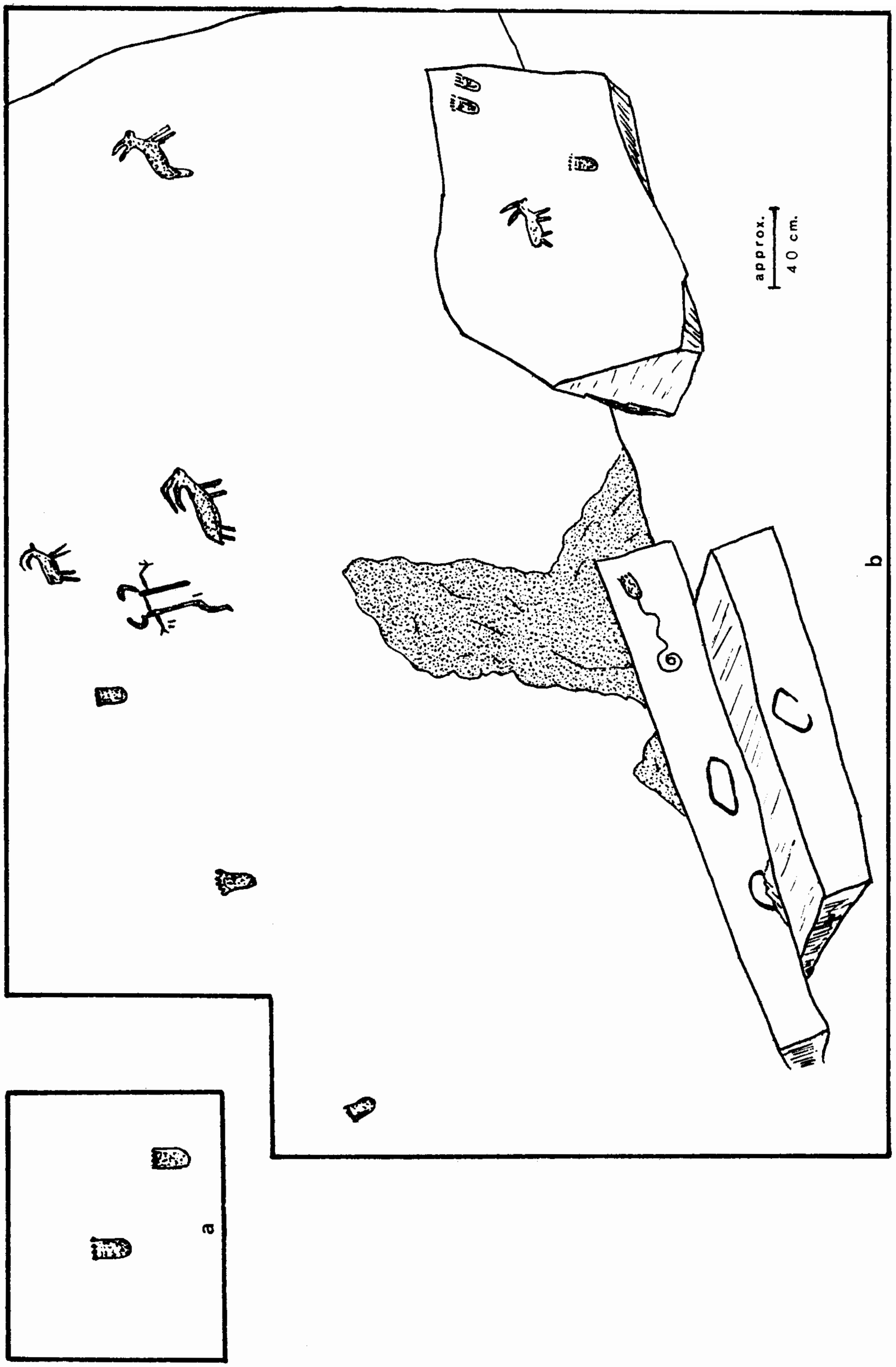


Figure 35. Rock art, south panel of 5ME175. 100 x 120 cm panel on slightly overhung face of very large boulder (also containing panel in Fig. 34). All figures are pecked with one area of undefinable scratches near center.

Figure 36. Rock art, 42GR584. a, two isolated tracks in a panel measuring 45 x 30 cm; located on a boulder in a boulder field; b, group of figures on exceptionally large boulder and three rocks at its base; main panel is about 6 x 3.25 m. The face of the rock is exposed and darkly patinated; some of its surface is exfoliating. All figures on the smaller rocks appear to have been made after the rocks reached their present position.


approx.
40 cm.
a
b

ENVIRONMENTAL CONTEXT

The topographical and ecological changes through which the Dolores River passes between its head and its mouth are dramatic to say the least. The survey area under primary consideration here begins in a transition zone from the alpine conditions of the headwaters to the truly desert conditions of the lower reaches. Elevations of sites recorded in 1975 range from 6,720 to 4,160 feet in the space of about 170 river miles (275km.). Sites from immediately upstream are known at elevations of around 6,900 feet (Toll 1974); on the canyon rim north of Dry Canyon sites as high as 7,880 feet are recorded (Kane 1975b); the highest site in the House Creek Timber Sale is 7,720 feet above sea level (Zier and Robinson 1975; see Figs. 104). Sites, then, are known from an elevational range of 3,700 feet; the total available range of the Dolores drainage is over 10,000 feet (3,050 meters)(Simmons n.d.), grossly indicating the diversity in terrain and living resources present. Canyons that are up to 2,300 feet deep add another dimension to the relief. While a detailed discussion of either the geology or the ecology is impossible here, a brief consideration of the river's progress with regard to its influence on prehistoric usability is warranted. In order to facilitate an understanding of the topography some segmentation of the Dolores' course has been imposed. All of the geological information is taken from Cater (1970) with especial attention to his 1:62,500 geologic maps and from

1:250,000 U.S.G.S. Geologic Quadrangles (Haynes, Vogel and Wyant 1972; Williams 1964).

From the town of Dolores to the vicinity of the Dolores River Ranch the canyon is quite wide, having considerable space on the valley floor. The vegetation on southern exposures is pinyon-juniper forest; on northern exposures there is dense Gambel oak and in canyon bottoms and side canyons large cottonwoods, ponderosa pine, and, more restrictedly Douglas fir and aspen are present. The canyon sides are largely talus with some large exposures of white sandstone (most notably the Lone Dome) which may be Entrada Sandstone (Figs. 37 and 38).

Below the Dolores River Ranch and Narraguinnep Canyon the main canyon becomes increasingly deep and narrow. Simmons (n.d.) appropriately terms this section the Ponderosa Gorge, which ends several miles above the Disappointment Valley and Slickrock. The vegetational transition continues in this section, the change being perhaps more marked here than anywhere else on the river. Ponderosas are large and abundant in its upper portions, but decline steadily in frequency, becoming absent by the end of this physiographic section. Other vegetation also conforms more and more to that typical of lower, drier, hotter regions. Toward the lower end of the Ponderosa Gorge (i.e., beginning around 5SM34) a vegetational phenomenon of possible considerable cultural import was noticed, which holds true for most of the remainder of the river. While pinyon pine is now present it is almost without exception very small (less than 1 m. high) when alive;

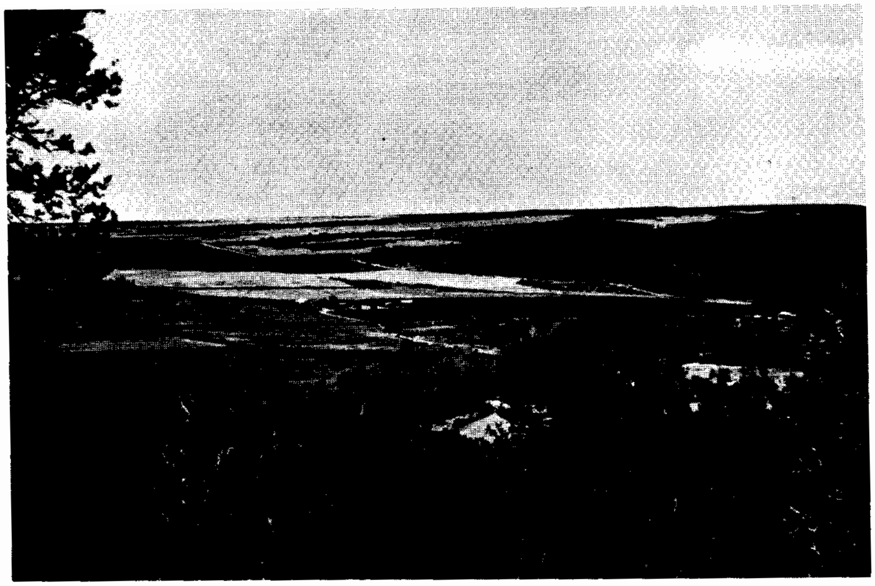


Figure 37. "Sage Hen Flats", about 5 km downstream from the town of Dolores. The river is in the foreground and the McPhee townsite is at left. Numerous sites are on the crests of the rises in the rolling terrain (Breternitz and Martin 1973, Kane 1975a). The canyon beings to entrench at right.

Figure 38. Lone Dome and the broad valley floor in its vicinity below the dam site. The currently agricultural valley floors of this nature do not seem to contain sites. Sites are also scarce on the steep canyon side shown; vegetation is denser on this slope shown than on the opposite side because of more northerly exposure.

furthermore, the only larger pinyons in evidence are dead. Because of the well-known ethnographic importance of pinyon this apparent cycle could have had much impact upon prehistoric use of the canyon. It may well be an illustration of the changing pinyon distribution and/or use as suggested by Madsen and Berry for the Great Basin (1975:403). The fact that the lower elevational limit of pinyon is around 5,000 feet (Patrow 1970:8) surely is a contributing factor, but the former presence of larger pinyon does seem significant. With the scarcity of pinyon, juniper becomes the dominant woody plant away from the river. The canyon itself is deepest and sheerest in this section. Much of this section has high vertical cliffs. All of the following geologic members are present along this stretch: Cutler Formation, Chinle Formation, Wingate Sandstone, and Kayenta Formation; Kayenta Formation and Navajo Sandstone; Morrison Formation members; and Dakota and Burro Canyon Formations (Haynes, Vogel, and Wyant 1972). With a few exceptions, such as Big Canyon, access from the canyon rim to the river is difficult at best (see Figs. 39 and 40).

As the Dolores approaches Disappointment Creek the canyon drops away gradually. Below the lower end of the true Ponderosa Gorge the river passes through a series of exposures of Entrada, Wingate and Burro Canyon sandstones near the river. Most of the cliff overhang (as opposed to boulder overhang) sites (5SM41, 43, 44, 45, 47, 50) recorded in 1975 are in this seven mile stretch. The Entrada sandstone exposure at McIntyre Canyon some eight river miles downstream from 5SM50 creates a similar situation of many utilized overhangs (see Breternitz 1972; Fig. 2 and Fig. 41 here).

The vicinity of the confluence of the Disappointment Valley with the Dolores Canyon is marked by shallow canyons with mostly talus sides (primarily Morrison Formation). Vegetation is extremely small and sparse and there is much open, rolling terrain (site photos 5SM48, 55, 56; Fig, 42).

From just above Slickrock to the entrances of Big and Little Gypsum Valleys the river is once again in a low canyon with much talus again mainly Morrison Formation. Big and Little Gypsum Valleys create vegetational conditions quite similar to those at Disappointment Creek though the valleys are smaller and have larger Quaternary alluvial deposits near the river.

Below Little Gypsum Valley the river enters the "Serpentine Canyon" (Simmons n.d.) which is sheer-walled (Wingate sandstone, Kayenta Formation, and Navajo Sandstone with some Entrada Sandstone and much Morrison Formation above), sinuous, and narrow. Most of the canyon vegetation is riverine because of the narrowness of the canyon; juniper and xerophytes are also present. Ingress and egress from the canyon are difficult except for side canyons such as Bull and Spring Canyons, and Coyote Wash. The cliffs of the Serpentine Canyon form a number of large and impressive

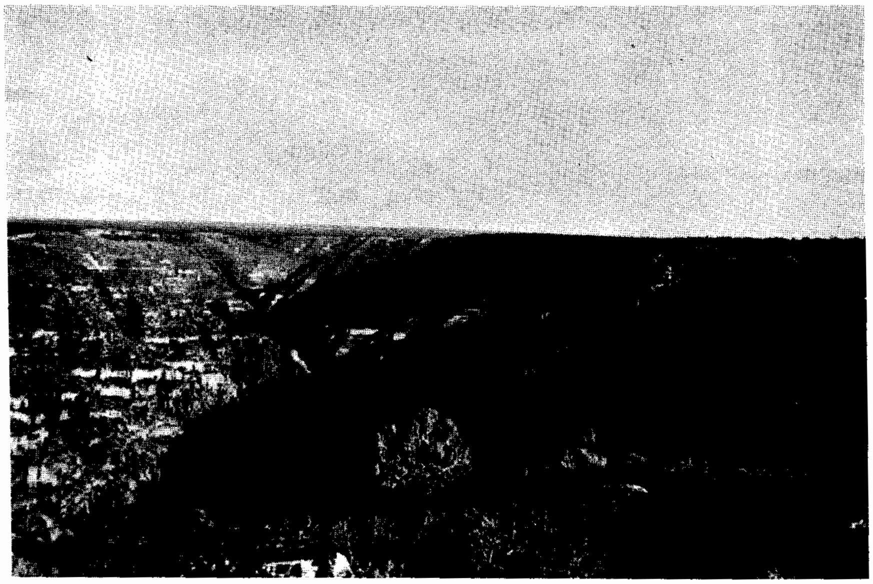


Figure 39. The Ponderosa Gorge near Mountain Sheep Point. The portion of the canyon shown is one of the deepest, narrowest, and sheerest on the Dolores. Sites are quite infrequent in this part of the canyon, through unusual sites 5DL180 and 5DL181 are on Mountain Sheep Point's flanks.

Figure 40. Lower end of the Ponderosa Gorge from the west rim near Egnar. Note the long steep talus slopes below the Wingate and Kayneta cliffs and the trend toward sparser vegetation. The Disappointment Valley may be seen in the distance.

Figure 41. Site 5SM43, an occupied overhang. Sandstone exposures near the canyon floors, such as this one of Entrada Sandstone, create overhangs which were used prehistorically. Such sandstone exposures at a usable level occur in only certain stretches of the Dolores' canyons.

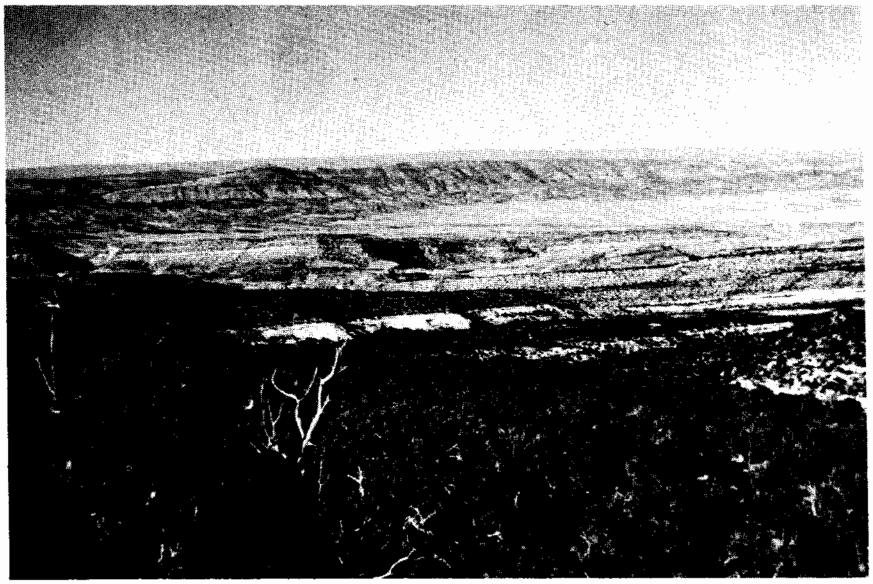


Figure 42. Disappointment Valley near Slickrock and its confluence with the Dolores. Shown are the low canyons and the sparse vegetation characterizing Disappointment and Big Gypsum Valleys.

overhangs two of which contain sites (5MN72 and 5MN73); many shelters are, however, empty.

From La Sal Creek to the Paradox Valley the canyon opens considerably, though its walls are still high and precipitous. Large Quaternary terraces are present below Chinle (mostly talus), Wingate, Kayenta, Navajo, and Summerville sandstones and formations. Following the pattern of reduced size with reduced elevation, small junipers are the main large vegetation, pinyons being very few (Fig. 43).

The Paradox Valley has a wide alluvial floor with a permanent stream west of the traversing Dolores. The west half of the Paradox has considerable modern cultivation and, especially at the westernmost end where there are springs, is more lushly vegetated than the east half (Fig. 44).

Upon leaving the Paradox Valley the Dolores once again travels through a deep canyon. From the exit from the Paradox to the San Miguel confluence and from Roc Creek to about three miles above Gateway the stratum usually closest to the river is the Chinle Formation. As in the Glen Canyon, the Chinle's instability means that it usually takes the form of talus slopes. Frequently the Chinle talus is covered by fields of large boulders which have fallen from the superimposed Wingate, Navajo, and Kayenta sandstones (Jennings 1966:10; Figs. 46, 47). In several cases, e.g., 5MN433, 5ME175, the boulders thus placed were used as rock shelters. Above the San Miguel the talus frequently extends to the river banks, leaving few

Figure 43. The lower end of the Serpentine Canyon and the mouth of La Sal Creek (center)--vicinity of 5MN438-442. Little material is present on the large terraces: sites are at the talus base. The canyon widens here and sites become more numerous.

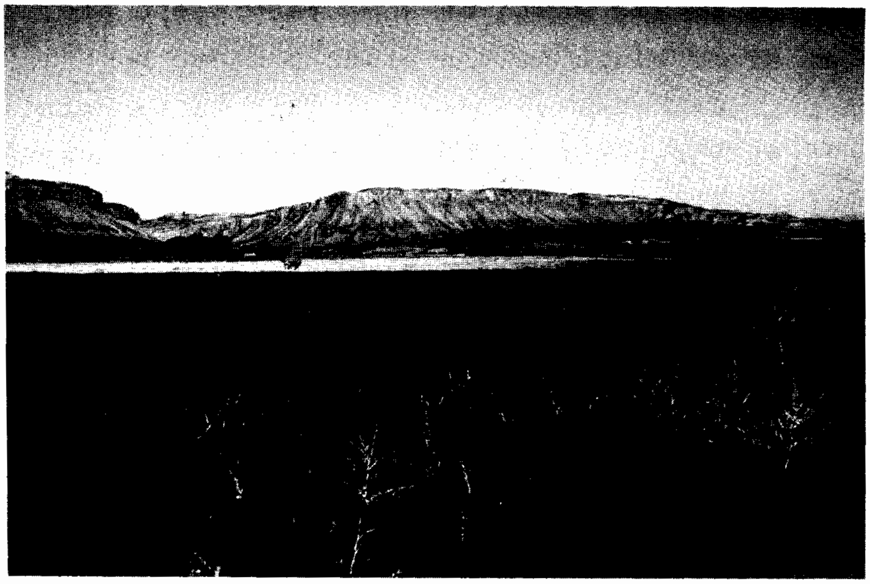


Figure 44. Paradox Valley from the west end. Note the very braod flood plain and modern agriculture. The Dolores crosses the Paradox Valley from right to left, the downstream exist being visible. The Woodburys' (1932) sites are out of frame to the left, farther west up the valley.

places for sites. Below the confluence is a section of sheer Wingate cliffs to the river, with high terraces above. The terraces are grassy, the slopes dominated by stunted juniper, and the river edge by willow.

From 2½ miles above the mouth of Mesa Creek five river miles to the mouth of Roc Creek there are wider alluvial areas close to the river bounded by smooth Entrada sandstone walls. This is especially true nearer Roc Creek where the alluvium is mostly flood plain (Fig. 45). Both Mesa Creek and Roc Creek have very sizable canyons that contain many cottonwoods. Though indigenous, there is some reason to suspect that cottonwood may often be a recent introduction because of its unfailing association with ranches in areas where it is not otherwise seen.

The canyon increases steadily but slowly in width from Roc Creek to Gateway containing the boulder fields described, surmounted by high walls primarily of Kayneta Formation (Fig. 46). The walls are cut by four large canyons: Blue Creek, Salt Creek, Maverick Canyon, and, at Gateway. West Creek as well as several shorter canyons. In this section sparsely vegetated gravel terraces begin to be frequent (similar to Figs. 48-50).

As described in the area surveyed section, the canyon opens nearly completely beginning above Gateway, the main riverside formation becoming first the Moenkopi, then the Cutler, with little soil cover.

Figure 45. Mouth of Roc Creek. Of apparent prehistoric cultural importance is the flood plain with little-entrenched permanent stream. Sites are known both from overhangs and from features similar to the terraces in the foreground and at right.

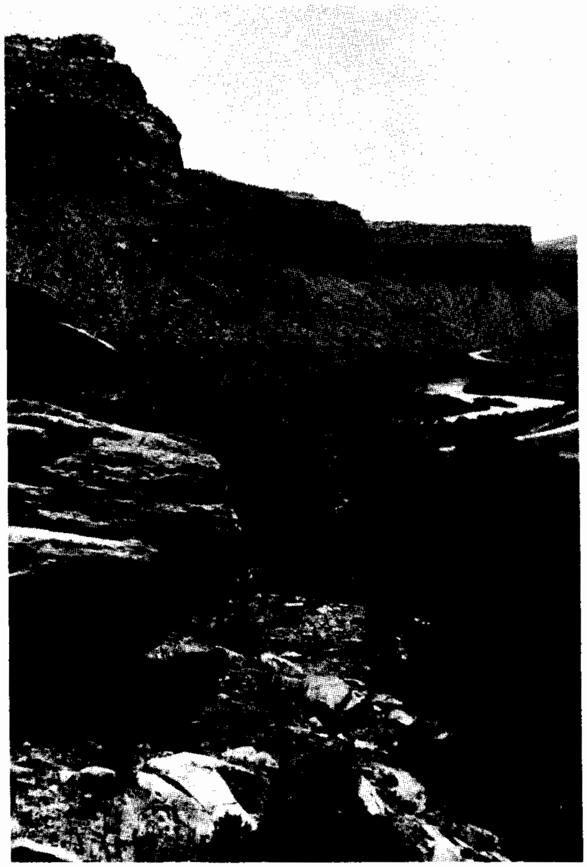


Figure 46. Looking upstream (south) past 5ME171, near the mouth of Salt Creek. The Chinle Formation talus and superimposed Wingate and Kayenta sandstones are visible; the dominant stunted juniper cover may also be seen, as well as use of a boulder overhang.

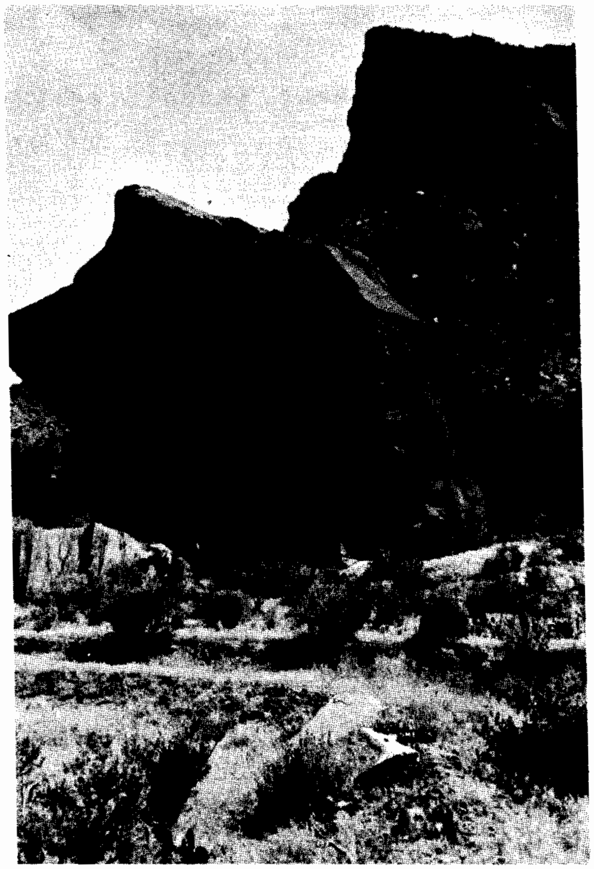


Figure 47. Site 5ME175. Large boulder at the base of the Chinle Formation talus which is covered by detritus from high, harder formations as is common in this stretch of canyon. Figure stands right of center next to boulder for scale.

Particularly below Gateway, away from the irrigated areas, vegetation becomes very sparse, limited to low cheat grass with small junipers mainly in the drainages (Fig. 48).

At the state line, near Sheep Creek, the Dolores enters its final large canyon, again of Wingate and Navajo Sandstones with Morrison Formation above and some Moenkopi and Cutler Formations exposed in the depths. This canyon is sheer and fairly narrow with entrances through Beaver and Fisher Creeks (Fig. 49). Shortly above Grantie Creek the canyon opens again toward the alluvial Utah Bottoms which are bounded by Entrada (south side) and Navajo Sandstones (north side) (Fig. 50). Canyons through the Entrada (e.g., Bridge and Cottonwood Canyons) support larger vegetation, but cover is otherwise thin and low at any distance from the river. The most extreme lack of vegetation reached along the river are the barren Mancos shale and Dakota and Burro Canyon Formation mesas and lower gravel terraces north of the river (e.g., Hotel Mesa) and Morrison Formation south of the river on either side of the river's final passage through the Summerville-Entrada stratum just above the confluence with the Colorado River (Fig. 50).

The vegetational data collected during the survey can add little to more comprehensive works for similar areas such as A. Woodbury's for the Glen Canyon (Woodbury 1965 and elsewhere) or Hunt's (1953:4-7) for the La Sal Mountains. A few specific observations may, however, be made. Most strikingly, from around

Figure 48. Open area below Gateway--5ME179, looking north. The lower gravel terraces seem to contain very little cultural material. As can be seen, vegetation is minimal except for by the river.

Figure 49. Beaver Creek Canyon from its mouth. The canyon form shown is similar to that of the Dolores Canyon--both the size of Beaver Canyon and the relative inaccessibility of both canyons other than through side canyons may be appreciated.

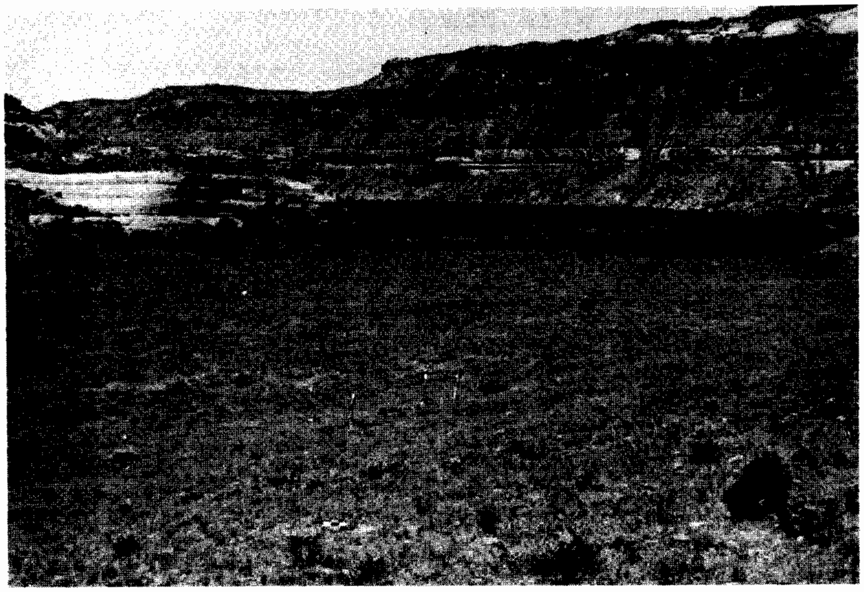


Figure 50. The Utah Bottoms, 42GR588 in middle ground. Large, barren gravel terraces similar to the one shown are common in the lowest stretch of the river. The different strata on the opposite sides of the river and the nature of the desolate higher mesas north of the Dolores (right) may be seen.

the confluence of the San Miguel with the Dolores to that with Roc Creek a variety of prickly pear is common that has large pads and in both 1974 and 1975 produced an abundance of large, succulent fruits. Dolores Cave, which is located in the same stretch of river, is reported to have contained "cactus" in addition to other wild products (Hurst 1947:11). Willow--a common basketry material--is present by the river for its entire length; it may have been even more abundant prehistorically before the introduction of tamarix which is now also common. Squawbush (Rhus trilobata), another basketry material that also has other uses, is also frequently seen, particularly above Gateway. Yucca is widespread as well, with the fineleaf variety more common at lower elevations.

Neither expertise nor data collection allow much elaboration on soils, but two observations are apropos. At the site level it is usually the case that soils are relatively rock-free, often being find red loess. Examples of apparent selection for such soils for sites are 5SM39-40 which are the only sites in a large section of otherwise rocky canyon slopes. On a much more general level, it is interesting to note on the USGS 1:250,000 geological quadrangles (Williams 1960; Haynes, Vogel, and Wyant 1972) that the distribution of non-gravelly Quaternary deposits--whether aeolian or alluvial--matches quite nicely that of horticultural sites. The coextensiveness is especially striking along the west rim of the Dolores Canyon east of Dove Creek. Here Quaternary deposits are not shown, bedrock being very close to the surface, and all sites are mostly lithic in content (Ward-Williams 1975a). Upon leaving the rim and reentering the area of large aeolian deposits (i.e., toward Dove Creek and to the south) pueblo habitation sites reappear (Kane 1975a). In the Dolores Canyon just above the Dolores River Ranch and in the Paradox Valley alluvial deposits are present as are horticultural sites (see Table 1). Soil-horticulture correlation is of course not perfect because of the numerous other factors involved such as moisture, temperature, and elevation, but there is a definite, understandable correspondence.

A more general and all-encompassing summary of natural resources, vegetation, soils, moisture, wild-life and currently cultivated lands may be found in an environmental statement prepared by the Federal government (BOR-NFS 1975).

CULTURE AND ENVIRONMENT ON THE DOLORES RIVER

In view of the great diversity of canyon form, vegetation, available moisture, and climate present on the Dolores some differences of adaptive strategy would be expected as a matter of course. The most marked such difference occurs at the extreme upstream end of the 1975 survey area (see Table 1). Here, and in the canyon just below the town of Dolores, the larger canyon floor in combination with moisture and proximity to the Anasazi area (Mesa Verde branch) made possible a full-scale horticultural subsistence. The Dolores River forms a fairly distinct eastern boundary to the Mesa Verde Anasazi area (see for example Breternitz, Rohn and Morris 1974; Kidder 1924). "Boundaries" of the area are much less distinct to the west and about as far north as Dove Creek.

The rapid change to deep canyon seen below the Dolores River Ranch understandably terminates evidence of Anasazi-like subsistence quite abruptly. Topography, soil, and possibly the frost-free period in the main Ponderosa Gorge are simply not suitable for crop raising. With some possible exceptions to be noted below, conditions remain unfavorable for most of the rest of the river's course. The location of Anasazi structural sites 5DL180 and 181 in the Ponderosa Gorge is anomalous in that little, if any, suitable agricultural terrain is at all easily accessible from the sites. It may tentatively be suggested that these are storage structures (as supported by the size of several of the rooms at the sites), a more permanent gathering base, or perhaps a refuge. The fact that no similar sites are in the vicinity complicates the structures' explanation and reinforces the anomaly. It should be noted that the agricultural area above the canyon to the west and south is accessible through Big and Secret Canyons.

The principal adaptation in question, then, is to the canyon. For convenience this adaptation will be referred to as Archaic (after Willey and Phillips 1958), though the temporal and developmental overtones of the term are here often inappropriate. Basically, Archaic subsistence may be considered to mean hunting and gathering of wild resources, in this case by any group. Canyons are peculiarly suited to Archaic subsistence, as they create a number of closely-spaced, different micro-environments. Environmental diversity is particularly marked for much of the Dolores River Canyon because of the nearness of much higher elevations such as the San Juan Mountains, the Glade, the La Sal Mountains, and the Uncompahgre Plateau. Transition zones or ecotones are characterized by greater diversity in the biota than the larger zones between which they lie. Such diversity in ecotones is referred to as the "edge effect" (Odum in Gumerman and Johnson 1971:84). The diverse areas are cross-cut by a number of side canyons; Jennings (1966:11) and Woodbury (1965) both note that the side canyons of the Glen Canyon contained even greater diversity than the main canyon, and that they were more heavily prehistorically used. The Dolores assumes further importance when the scarcity of water in the area of the lower reaches is considered. The appropriateness of Archaic subsistence patterns to the canyon country raises the important point that this strategy was an alternative not only open to horticulturalists but a fixed part of their subsistence. Lending credence to this contention are the recognizable Anasazi artifacts discussed above that were found some distance from the Anasazi agricultural area. There is of course no firm assurance that Anasazis transported these artifacts to the sites where they were found, but their presence _is_ suggestive.

In the West Paradox and Roc Creek Valleys as well as in several tributaries to the San Miguel River horticultural subsistence is indicated though on a much more limited basis than in the Anasazi area (see the Woodburys 1932; Hurst 1940, 1941, 1942, 1946, 1948; Toll 1975:39-40). As in the main Anasazi area this pattern is associated with wider alluvial canyon floors; in this more northern area there are always small permanent streams also present. It seems likely that either small scale irrigation or a very high water table was necessary for this pattern; generally the Dolores and the San Miguel are too far below the alluvial terraces for either of these conditions to pertain. Probably the most appropriate cultural label for these sites is San Rafael Fremont Culture (Marwitt 1973:143-5; Leach and Lippold 1973), though the application of this label must be somewhat conditional.

While the Anasazi probably often practiced hunting and gathering it is even more likely that the Fremont groups did the same (Green 1974; Madsen 1975), so that some sites on the Dolores may in all likelihood be attributed to Fremont gathering away from structural sites.

It seems entirely possible that both horticultural and non-horticultural groups could have used the canyons during the same periods. There is, however, a tendency among Fremont students to imply that with the appearance of horticultural subsistence there was a replacement of non-horticultural groups (e.g., Jennings 1966; Schaafsma 1971; Madsen and Berry 1975; Marwitt 1973). There are a number of mechanisms that might have effected such a replacement--adoption of horticulture by all groups in the area, active territorial protection by horticulturalists, resource competition forcing movement of Archaic peoples to other areas, for instance--but the issue is generally not treated. Buckles (1971) describes a complete, unbroken sequence of phases across the Uncompahgre Plateau from the San Miguel-Dolores drainage. Buckles' Coal Creek Phase dates from A.D. 700 to 1300 which spans all estimates for horticultural presence in western Colorado and eastern Utah. The phase is well represented and firmly placed chronologically and, while showing some horticultural influence, follows the Archaic pattern of the Uncompahgre Complex (Buckles 1971:1276-81). Non-horticultural groups were thus in the region during the horticultural groups use of it, in addition to being there before and after (see also Hunt 1953:18-21). There is at present no way of corroborating such a coexistence, especially for the same areas at the same time, but it seems a question worthy of further investigation.

The label of San Rafaël Fremont assigned above to the northern Dolores horticulturalists raises a number of never-ending anthropological questions. Certainly no pretense can be made of resolving finally what a culture area is--Fremont versus Anasazi, for example; defining for all time the Fremont; or drawing boundaries around any of these entities. Consideration of such questions, however, can help to see the Dolores inhabitants in a broader geographical frame and perhaps help to better understand their adaptations from what data are available.

In addition to the locational considerations listed above there are several relevant general characteristics of the structural-horticultural sites in question:

(1) individual rooms or small blocks of rooms (Woodbury 1932; Hurst 1946, 1948; Toll 1975; Vondraček, personal communication).

(2) location away from the flood plain more often than not on high points and sometimes "defensible" and having wall interpretable as defensive in nature (Hurst 1946; Toll 1975).

(3) pottery in association but in <u>very</u> small quantities; the pottery seems to be mostly Anasazi,

but the classifications are on the whole 30 to 40 years old. Corrugated and painted wares are present in much higher percentages than at sites in eastern Utah. Lithics are much more abundant than pottery. The scarcity of pottery holds true for excavated sites as well as surface collections (Appendix C; Hurst 1946, 1948; Vondraček, personal communication).

(4) corn in association in indeterminate quantities.

At this point it is useful to introduce two related theoretical definitions by David Clarke:

(1) Technocomplex.

> A group of cultures characterized by assemblages sharing a polythetic range but differing specific types of the same general families of artifact-types, shared as a widely diffused and interlinked response to common factors in environment, economy and technology. The material manifestation of cultural convergence within a common stable environmental strategy (Clarke 1968:188).

(2) Regional subculture.

> Regional subcultures are genetically related, semi-discrete but continuous branches of a single culture which by virtue of poor intercommunication and growing isolation gradually develops distinctive subcultures by divergent development pooled over local territories (Clarke 1968:236-7).

In spite of the apparent contradiction between convergence and divergence, the above terms used in combination cover fairly satisfactorily the situation on the Dolores in the vicinity of the confluence with the

San Miguel. Key elements in the definitions are "polythetic", "common factors in environment", "stable strategy", and "semi-discrete but continuous".

The horticultural sites under discussion may be seen as containing some Anasazi artifacts but as otherwise following very closely Fremont site patterns in location and architecture. There is a point-for-point correspondence in location with especially Gunnerson's (1957:4-5) sites from eastern Utah. Gunnerson's surface collections contain about as much pottery as the excavation collections from the San Miguel-Dolores area (Hurst 1946, 1948; Appendix C). Differences from San Rafael Fremont sites in Utah in ceramic assemblages are that gross counts are far higher, that the vast majority of ceramics are placed in Fremont types and that percentages of corrugated and painted wares are very low. The highest percentage of corrugated, which at times in site reports includes neck-banded, sherds encountered is 6% from the Turner-Look site; corrugated from other sites generally compose 1% or less of recovered ceramics, but are usually assigned to Fremont rather than Anasazi types (Wormington 1955:76-7; Taylor 1957; Gunnerson 1957; 114, 129). Anasazi pottery is present in higher percentages in the San Rafael Fremont than in the other Fremont variants (Marwitt 1973:143), but the percentages are still on the order of not more than 4%. Sherds are more common in the lower elevations of Hunt's (1953:160) La Sal survey than around the Dolores, but are not common. Both Anasazi and Fremont sherds are reported but quantities or percentages are not given.

A preliminary report of more recent tests in Paradox Valley (Leach and Lippold 1973) contains much data supportive of a Fremont Culture classification for the Paradox. Fremont pottery was recognized, though corrugated wares remain predominant "on all levels". Some division is seen between a Fremont and an Anasazi component with more plain gray pottery associated with the Fremont structures. A pithouse with superimposed room was found and dated to Basketmaker III solely by the type of structure; the association, or lack thereof, of corrugated sherds with the pithouse is not clear. The two components seem to be separated primarily on ceramic grounds though the remainder of the component characteristics sound quite similar.

From the preceding superficial comparisons it is hoped that the utility of the definition elements "polythetic" and "semi-discrete but continuous" is apparent. An iron-bound, monothetic cultural assignment of either Anasazi or Fremont is not possible, but, in spite of the element of ceramic types the subsistence-settlement pattern of west Paradox and similar sites seems most usefully compared to the Fremont. Ambler (1966:175) non-specifically relegates "the Dolores drainage" to the Anasazi; most early workers also make this assignment (Woodburys 1932; Hurst 1939-1948) as do others who discuss the area at all (Schroeder 1964; other views summarized in Herold 1959:21, 32-4). Gunnerson (1960) sees all of the Fremont as essentially deriving from the Virgin Anasazi. In many ways the label depends primarily on the material traits either stressed in the literature or by the labeller, which in this case is usually the pottery. But, if the amount of pottery recovered is indicative, ceramics were not highly important in the utilization of the sites. The term "Fremont", then, is used advisedly--perhaps loosely--as is "Archaic", as a best approximation to the adaptation apparent.

A further reconciliation of facts to theory can be attained by returning to the idea of the continuous in terms of the environmental setting. One of the more appealing speculative reasons for the paucity of material at the structural sites is that, located as they are near what seems more nearly a series of ecotones than merely one, an Archaic subsistence pattern remained of predominant importance with horticulture as a seasonal but not crucial hedge against shortages of other resources. The evidence as it now stands fits quite nicely into a continuum of adaptations, being near a fully hunting and gathering adaptation, as seen in much of the canyons, in areas to the east, and at higher elevations (e.g., Hunt 1953; Green 1974). As Leach and Lippold (1973:22) state in their proposal for further work:

> Most students of the Fremont have commented upon the fact that Fremont is characterized by an economic base of mixed emphasis; however, the degree of mixture remains basically unstudied.

To perhaps a lesser extent, but still with considerable validity, the same may be maintained for the Anasazi. Jennings (1966:2, 45, 62) repeatedly stresses the importance of gathering to the Anasazi. That he should do so is not difficult to understand because of his strong belief in a long, *in situ* development of regional subcultures from a Mogollon pattern on a "Desert Culture" base. He further states that the "high centers" such as Mesa Verde and classic Kayenta (Betatakin, Kiet Siel) are not modal Anasazi manifestations but that smaller "backwoods Anasazi" sites are far more numerous. It is interesting on another level that Jennings, from the perspective of Utah and of the Glen Canyon (with its many parallels to the Dolores), should state the case for dependence on wild resources as strongly as he does--the Dolores prompts the same tendencies. While the importance of wild resources probably has been understressed in areas of high density pueblo habitation sites, Jennings' reaction seems to be excessive, at least for the areas such as the Mesa Verde region (for a similar reaction and assessment see Green 1974:1-2).

Introduction of one final outside construct serves to bind the above together and to relate it to the Dolores as a whole. Gumerman and Johnson (1971) are using the following approach in a large scale project in Central Arizona. Though the scope of our work on the Dolores is much smaller, the eco-tone edge effect is even more dramatic on the Dolores than in their area. They state,

> We feel that the concept of the ecotone as a heuristic device provides an ideal construct for the study of factors affecting the occurrence and distribution of human habitation in a biological tension zone. The edge area may, in addition, result in and explain what are called subcultures, or regional cultural

> varients [sic]. It may also explain other differences in population density, settlement pattern, and differences and diversity in subsistence patterns. It may also explain site locations in defensive positions due to warfare over the natural resources of the edge area. In other words, the use of the ecotone concept in archaeology may help anthropologists to understand the zones between culture areas, a vexing problem that has been recognized since the careful formulation of the culture area concept in North America (Gumerman and Johnson 1971:84-5).

In the contexts of the various definitions borrowed in the foregoing it seems less important to assign cultural labels. What emerges is the general relationship of adaptation as seen in the widespread technocomplex. At the level of the technocomplex, which ignores to some degree local variations, the view that Fremont and Anasazi variants are the results of long in situ developments on a basically Archaic pattern (here reintroducing the developmental implications of the term) makes a great deal of sense (e.g., Jennings 1966; Aikens 1970; Marwitt 1973; Ambler 1966). As stressed generally by Clarke (1968) and specifically for the "Desert Culture" by Williams, Thomas, and Bettinger (1973:220-1) it must be kept in mind that the "base culture" is a polythetic concept and a synthetic concept (Jennings 1973). Moving then to the level of the regional subculture mechanisms for local variation are apparent, especially when viewed in the context of environmental possibilities and limitations of ecotones such as the Dolores. Remembering the mobile nature of the Archaic or basic pattern, it is obvious that Clarke's genetically phrased isolation leading to variation is by no means an absolute isolation, all of which reconciles the contradiction between divergence in regional sub-cultures and convergence in technocomplexes. Though occupations may not be as continuous as has been maintained (Madsen and Berry 1975) certainly "a common stable environmental strategy" did exist for several thousand years within the Utah-Colorado area (Aikens 1970; Buckles 1971). Because of the fact that we are dealing with a "technocomplex" some difficulty can be anticipated in the cultural separation of assemblages not containing plainly diagnostic items or firm associated dates, even should needed refinements in the understanding of technology take place.

Distribution through time of the various mixtures of adaptation is of course more difficult to delineate than distribution in space, especially with only surface data. The stratigraphy in Paradox (Leach and Lippold 1973), at Tabeguache Cave II (Hurst 1943-5), and along the northeast flanks of the Uncompahgre Plateau (Wormington and Lister 1956; Buckles 1971) indicates time depth for both the Archaic and the interstitial horticultural-Archaic adaptations. "Basketmaker" is a frequently used term in the earlier literature when discussing Western Colorado sites, and Pecos classification dates for that period--A.D. 400-700--are often generalized to western Colorado. This practice, however, is highly suspect in the light of three major considerations.

(1) The nature of corroborative dates. Hurst's dates from Tabeguache Cave I (1941:11) of A.D. 348, 361, and 372 are from juniper, dated by amateurs, and seem likely to be based on Arizona series. The single tree ring date of A.D. 750 from Castle Park is also suspect because of its solitary nature (Schaafsma 1971:126).

(2) Basis for phase assignment. All main arguments for calling the various sites Basketmaker are typological (Burgh and Scoggin 1948; Hurst 1940-42; Leach and Lippold 1973:10) based on house form, association of plain gray pottery, sandals, and dart points. If the idea of a generalized technocomplex can be accepted many of the criteria of assignment become suspect. Further, Jennings (1966:56) points out that the pithouse remained the preferred Kayenta Anasazi dwelling into the 1300's.

(3) More recent dates for the Fremont. Radiocarbon and tree ring dates obtained after many of the "Basketmaker" assignments were made show similar traits associated with absolute dates much after A.D. 700 (and often 900) and very few prior in the Fremont area (dates tabulated by Marwitt 1973:144-5).

One final speculation about the consistency or continuousness of use of the canyons through time is suggested by the stratigraphic records mentioned previously. Most of the profiles indicate periods of disuse of the various sites. Jennings (1966:18-21) suggests that the impact of prolonged use of a small area by a human group would be heavy, especially on some species within a bounded canyon ecosystem. If such species were critical, movement from the area would be necessary, perhaps to the less restricted plateaus (Jennings 1966:23-30). This is not much more than the Archaic subsistence postulated; it does however perhaps add to the picture of canyon use and help explain stratigraphic breaks.

Considering, then, both the canyon and the nearby uplands to be a single sphere of exploitation, much about site distributions can be explained in terms of prehistoric accessibility to various areas. Thus it is that relatively few sites are to be found in the more profound canyons, such as the Ponderosa Gorge or the Serpentine Canyon. As may be seen in Figures 1-3, sites tend to cluster around confluences with major side canyons (e.g., McIntyre; Big Gypsum, La Sal Creek to Paradox, Roc Creek, Blue Creek, Salt Creek, and Beaver Creek). This distribution is surely partially a result of use of these canyons for access to the river. Such distribution is also very much in keeping with Archaic subsistence in that these canyons further maximize the ecological diversity available to prehistoric inhabitants, as most connect with terrain different from that of the canyon (see also Jennings 1966). There is also a striking association of rock art with these apparently much used confluences: Big Gypsum, La Sal Creek, Roc Creek, Blue Creek, and Beaver Creek all have at least one rock art site near their mouths, suggesting aboriginal recognition of their importance. The section of canyon from Blue Creek to Gateway further illustrates the importance of the side canyons to site location. While this stretch is more open and amenable to foot travel than many others, and while boulders such as those used at 5ME167-8, 171, 172A, 174A, and 175 abound, very few were used and most that were utilized are near confluences. Clustering around side canyons is also apparent in the more desolate Utah section (Fig. 3), which supports the idea of the side canyons' access to other resources.

Aside from the major adaptational difference of horticultural vs. Archaic subsistence noted more subtle changes in non-horticultural sites may also be discerned. Some changes, such as choice of site location, are due to availability of geological features such as overhangs. The more inaccessible canyon areas appear to have been used, though infrequently, as is evidenced by isolated artifacts. A similar change is occasioned by the decline in available subsistence resources with the increasing barrenness of the lowermost portion of the Dolores. Here, as in the areas of difficult access, few cultural manifestations are present, and what evidence was recovered includes a higher than usual frequency of isolated artifacts. Further, many of the sites in the sparsely used areas contain smaller quantities of material, adding to the interpretation of less intensive use.

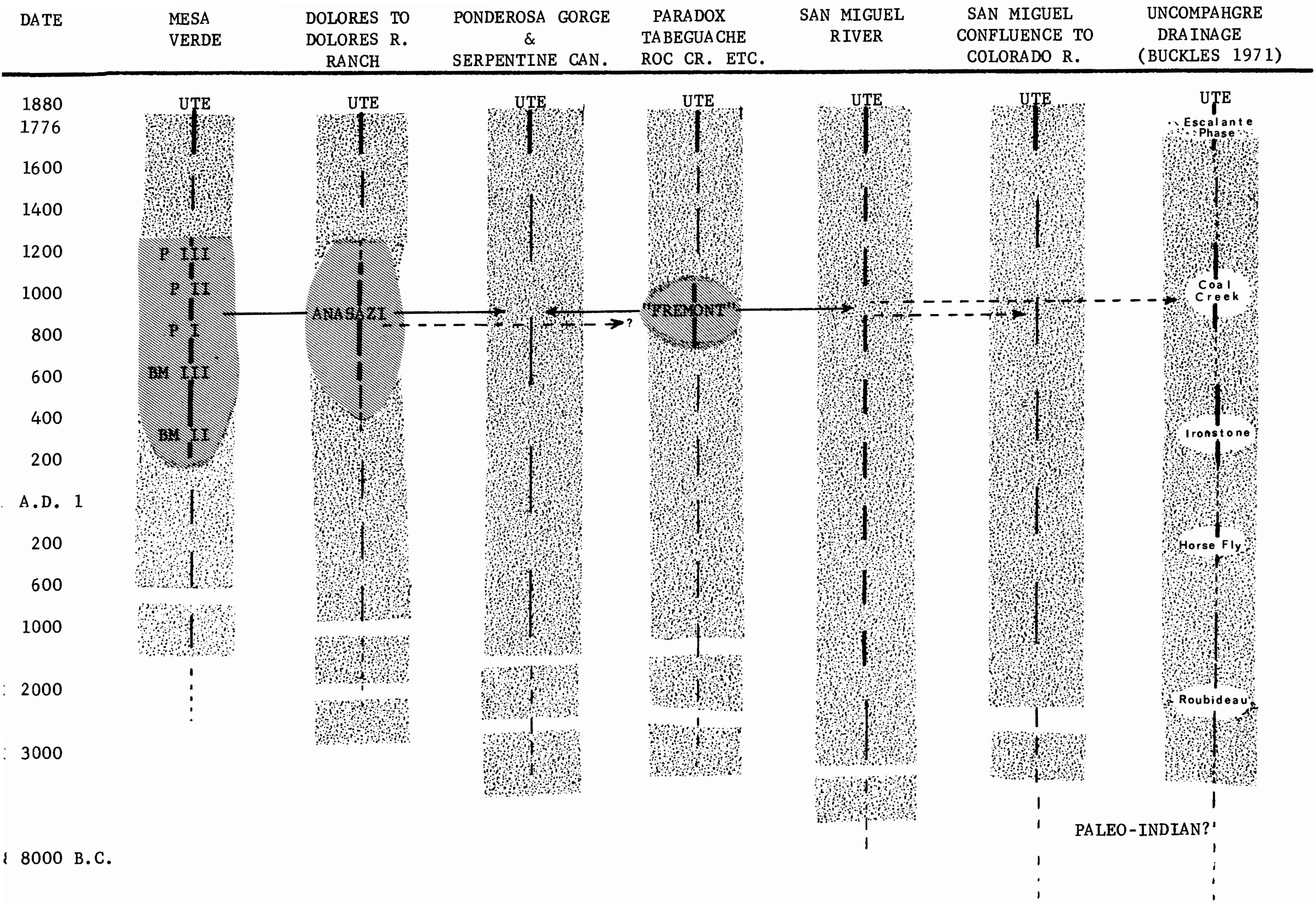
Aboriginal Time Depth on the Dolores River.

The Dolores drainage lies entirely within the area known from first white contact as Ute territory (Brün 1955; Bolton 1950; Buckles 1968; Stewart 1942; 1966). Rock art (5MT2412, 5ME165, Fig. 31) and the metal projectile point (5DL188B, Fig. 5d) recorded during surveys of the Dolores River give material evidence of the aboriginal use of the river during the historic period, as do Escalante's accounts and Miera's map (Bolton 1950).

Buckles (1968,1971)and Stewart (1966) argue on adaptational, linguistic, and archaeological grounds that the Ute area was long occupied by groups using a "Desert Culture" adaptational strategy, much as envisioned herein for the Dolores. Evidence from north and east of the Uncompahgre Plateau (Buckles 1971: 1185; Wormington and Lister 1956) indicates that occupation in the Uncompahgre River drainage was fairly continuous from 2,000-3,000 B.C. or earlier until the historic period, though the early ranges lack definiteness. It is no inferential strain to generalize Buckles' nearby dates to the Dolores. Typological dates for the Dolores proper are secure for the Mesa Verde Pueblo period, and reasonably so to at least 500 B.C.(see Artifacts section). Vondraček's single Carbon 14 date from Roc Creek is 905±60 (UGA 926) which is not out of line with other chronometric dates for the Fremont Culture given by Marwitt (1973: 144).

There are some suggestions that there may have been Paleo-Indian use of the general vicinity. Hunt and Tanner (1960) report Folsom points in probably appropriate geological context near Moab; both Buckles (1971) and Hunt (1953) also each found single typologically Paleo-Indian points in their respective areas but there are, of course, questions of later transport of such isolates. As has been discussed, our survey can contribute little to the definition of the early time ranges.

Figure 51. Time and adaptation on the Dolores River. Shown is an approximation of prehistoric use of the Dolores as now understood for the various subdivisions. Time ranges as shown are quite speculative particularly toward the earlier end. It is interesting to note that the Paleo-Indian hunting adaptation is not represented in the canyons (at least not by diagnostic projectile points), further emphasizing the peculiar suitability of canyons to an "archaic" strategy. Predominantly archaic adaptations are represented by stippling, horticulture by diagonal hatching. Movement by horticulturists between physiographic divisions (and thus subsistence modes) is indicated by arrows. Estimated intensity of use is shown by the dashed vertical lines (e.g., the San Miguel River is thought to show heaviest use through time). Note that the time scale is variable.


DATE
MESA VERDE
DOLORES TO DOLORES R. RANCH
PONDEROSA GORGE & SERPENTINE CAN.
PARADOX TABEGUACHE ROC CR. ETC.
SAN MIGUEL RIVER
SAN MIGUEL CONFLUENCE TO COLORADO R.
UNCOMPAHGRE DRAINAGE (BUCKLES 1971)
1880
1776
1600
1400
1200
1000
800
600
400
200
A.D. 1
200
600
1000
2000
3000
8000 B.C.
UTE
P III
P II
P I
BM III
BM II
ANASAZI
"FREMONT"
?
Escalante Phase
Coal Creek
Ironstone
Horse Fly
Roubideau
PALEO-INDIAN?

CONCLUDING CULTURAL DISCUSSION

> "Things little known are named and man speculates about these little-known things, and erroneously imputes properties or attributes to them until he comes to think of them as possessing such unknown and mistaken attributes. At last he discovers the facts; then all he discovers is expressed in the terms of number, space, motion, time and judgment. Still the word for the little-known thing may remain to express something unknown and mystical, and by simple and easily understood processes he reifies what is not, and reasons in terms which have no meaning as used by him."
>
> J. W. Powell 1898
>
> (quoted from Truth and Error by Darrah 1950:379-80).

It would of course be deluded to think that the survey or, more so, the foregoing discussion has solved any major archaeological problems. Particularly with smaller scale surveys such as that reported here, the primary purpose of survey is to provide a basis for future more intensive work (Judge 1973:23). The purpose of small scale discussion is to take the data one step past the raw stage and to thus provide possible frameworks and problems for the same future work.

In summation, archaeology on the Dolores River presents a healthy theoretical tension between local variation and adaptational generality. Because of the nature of the data at hand, the "adaptive sphere" has been focused upon (Binford 1965:132); it has been held that many broad similarities exist--a technocomplex--because of the overall nature of the "adaptive area" of the Southwest (Clarke 1968: Binford 1965). At the same time there are naturally some manifestations of Binford's other variables, stylistic traditions and intersocietal relations, which, in combination with the variety of adaptational possibilities within the area, produce variability complementary to the similarities.

Questions of population movement versus "influence", intrusive peoples versus changes in subsistence or other patterns, and of similarity because of contact versus because of similarity of function or because of chance variation will probably always occupy archaeologists. On the Dolores, especially in the absence of very detailed studies such a petrography, stratigraphy, or technology, these questions are very much in evidence. Thus, while there can be seen an expectable Archaic stylistic diversity throughout the area, at the same time the assemblage from West Paradox is stylistically more homogenous. Some of the diversity is attributable to the lack of time control inherent in surface data, but still the local-general tension remains. Another example of this idea may be seen in the mixture of "Anasazi" and "Fremont" traits present in Paradox--e.g., Anasazi pottery at sites following Fremont patterns; however, even the mixture has its own cast, such as the scarcity of pottery of any kind. In many ways the rock art is an analogue to the overall picture showing its own mixture of general similarities with locally specific differences.

Interacting at a fundamental level with all the problems of cultural similarities and differences is of course what was locally available for exploitation and what sorts of adaptive strategies were locally possible. As has been noted repeatedly, local variability of environment is marked on the Dolores. Disregarding their choice of traits, it seems that the basically non-productive trait list comparisons of Wormington and Lister (1956:78-92) for the Uncompahgre Complex serve best to illustrate the technocomplex idea and the operations of local environment and probably chance in recovery (see also Buckles 1971: 1177-87), rather than large cultural differences. The same may be said for those who found problems in applying the synthetic concept of the "Desert Culture" in a trait list fashion (Williams, Thomas, and Bettinger 1973; Jennings 1973).

Two conclusions are thus suggested, at least one of which is a cliche. First, it seems desirable to regard the cultural adaptations present as more continuous than terms such as Anasazi, Fremont, Archaic, or Uncompahgre Complex would imply. Second, more work is needed. Some amelioration of the frustration of ending on the overworked, latter note may be found in, first, that the survey is supposed to be the basis for more work, and second, in the exciting potential for studying these many problems presented by the Dolores River.

ARCHAEOLOGICAL POTENTIAL OF THE DOLORES RIVER

Current Condition and Conservation

Even though much of the Dolores is fairly inaccessible and not renowned for its archaeological riches, many sites have suffered at the hands of the all-too ubiquitous treasure hunter. Unfortunately pot hunters know all too well that overhangs frequently contain cultural material, and these valuable sources of perishable, technological, adaptational, and perhaps temporal data are nearly all somehow disturbed. Their conservation poses an especially difficult problem because of their high visibility and their reputation plus the lack of any adequate means of potecting them. It has been recommended to the Bureau of Land Management that carefully planned and executed excavation of these sites take place in the near future. Urgency is heightened by the increased visitation to the river and its canyons.

Open sites comprise over 60% of the sites now known on the Dolores. While perhaps less prone to extensive vandalism, they have their own set of conservational and interpretational problems. In addition to the randomizing effects of erosion and weathering, all surface collections are potentially further skewed by activities of "arrowhead hunters". Many, though certainly not all of the open sites recorded probably lack stratigraphic depth; estimating depth purely from the surface is difficult, so once a local change in adaptation and the degree to which horticulture was a critical as opposed to a secondary resource. The Dolores' position between the Fremont and Anasazi areas in many senses is important to a whole suite of perennially debated questions about the relationship of the two, and their definitions.

Delineation of non-horticultural uses of the canyons by horticulturalists. Seasonality and focus of use would add to the understanding of the total adaptation and, again, the degree to which horticulture and wild resource procurement were mixed (Leach and Lippold 1973).

Ascertainment of relationships of non-horticultural groups to horticulturalists.

Study of hunting and gathering as a total existence. This, too, would involve questions of seasonality as well as of movement and periodicity of use.

Inquiry as to the specificity, or lack thereof, of tool kits to different variation in tool kits for similar tasks.

Overall effects of wide environmental diversity.

Such problems require different approaches and are in some cases only partially solvable, but, to reiterate, they require a research design and the more planning that can be done on a regional rather than piecemeal basis the better.

Particularly with the public's flourishing interest in ecological concepts and concerns a comprehensive view of Dolores River archaeology could add a fascinating facet to the recreational and educational "experience" to be had on the river. Until the archaeological resources are more fully scientifically understood--this including excavation and further survey--

the best protection for these resources is their anonymity and the cultivation of an enlightened anti-destructive attitude on the part of the visitors to the river.

APPENDIX A

Artifact Description and Collection Contents

This appendix contains an inventory of the contents of each collection made in 1975. The inventories appear in the same (i.e., numerical) order as the site reports. The initial analysis of the artifacts was made by Peter Gleichman and revised by W. Toll. Almost all determination of use were made macroscopically, with the exception of some of the "tools". Generally the criterion for designating an item a "tool" rather than a flake was the presence of intentional retouch, as opposed to use retouch.

Terms used follow standard sources such as Crabtree (1972) and Ahler (1970). Crucial usages are as follows:

side--refers to the lateral edge of a flake or tool.

face--either the dorsal (toward the cortex) or ventral (toward the core) surface of a flake or the analagous (though perhaps indistinguishable because of retouch) surface of a tool. In reference to cores, a face is an approximate plane on the surface of the core.

end--on flakes, either the proximal (or platform) or distal (opposite the platform) portion.

shearing--small flakes removed from an edge through use. Also sometimes called "use retouch".

backed--the presence of a naturally or artificially dull edge or surface opposite a used edge.

Material identification is far from standardized anywhere, and is often difficult for non-geologists. The definitions and abbreviations used here are:

quartzite (qe)--common material in which glittering crystalline grains are visible. Depending on the material, the grains may range greatly in size. Quartzite as defined here includes a wide range of colors and probably a range of geologic origins.

cryptocrystalline (crypto)--variety of quartz in which crystals are not visible. This is a very general category which includes both chert and chalcedony. Crabtree's (1972:57) definition applies here. The usage is a general archaeological one though it has been suggested that microcrystalline is more accurate (P. D. Sheets, personal communication; Purdy 1974).

chert (ct)--a cryptocrystalline here defined on the basis of its opacity and smooth surface texture; also covers a wide range of colors and may have inclusions.

chalcedony (cy)--much like chert except that the surface is waxier and the material is translucent. Chert and chalcedony have been separated for individual items in the following summaries, but subsumed under cryptocrystalline where groupings included both.

siltstone (slt)--fine-grained sedimentary stone which sometimes appears to have been silicified. Sedimentary banding is sometimes present; color is usually black to light gray.

igneous--these identifications, such as diorite or andesite, are somewhat tenuous. Some questions arose around a dense black material present in some collections; in the absence of glitter or bandings this has been called basalt.

Percentages of material have been included for each collection containing more than 10 items. Because of the collecting techniques as discussed in the text this is only a crude, though somewhat useful, classification of the collections.

All measurements are in centimeters. When an item with recognizable features of a flake is measured the "length" is considered to be the pressure or percussion axis or the medial axis if the former is the same or indistinguishable. When flake morphology is not visible, maximum perpendicular distances are given. The order in which the figures are given is always <u>length</u>, <u>width</u>, <u>thickness</u>. Rough size approximations of flakes are sometimes given as small or medium or large. "Small" may be taken to include flakes less than 3.0 cm. in length, "medium" around 4.0 to 7.0 cm. and large 9.0 cm. or more.

The figures are included in the artifact section in the text to give an idea of a range of the tools present; they are necessarily somewhat schematic. An arrow (⟶) indicates the location of a flake's platform and direction of the detaching force.
All figures are actual size.

5DL177
Chipped stone 40

Tools

point	qe	3.04, 1.88, .50 Complete. Uneven corner notches with convex base. Fig. 5a.
point	cy	1.46, .93, .26 Base fragment. Probably corner-notched with convex base. Retouched, used after breakage.
point?	ct	1.58, 1.77, .48 Possible midsection. Routh bifacial retouch, lenticular cross-section.

Flakes

Utilized
3 qe
1 ct

Unutilized
28 qe
4 crypto

Core qe 6.2, 5.7, 3.5
1 possibly ground sandstone cobble fragment

Quartzite (33) 82%; Cryptocrystalline (7) 18%

5DL178
Chipped stone 29

Flakes

Utilized
1 qe
1 ct
1 slt

Unutilized
20 qe
3 slt

Core qe 6.7, 4.9, 2.8 Flake, utilized.
Core qe 6.6, 6.1, 2.6 Flake, not utilized.
Core qe 6.0, 9.0, 3.1 Flake unutilized.

Quartzite (24) 82.8%; Cryptocrystalline (1) 3.4%; Siltstone (4) 13.8%

5DL179

Chipped stone 22

Tool

scraper qe 12.7, 6.9, 2.8 Secondary flake with retouch on distal end and 1 adjacent side, some step fracture present (both dorsal). Some ventral wear both sides, from either chopping or scraping. Fig. 5b.

Flakes

Utilized
1 qe

Unutilized
17 qe
2 ct
2 slt Many large flakes.

Quartzite (19) 86.4%; Cryptocrystalline (1) 4.5%; Siltstone (2) 9.1%

5DL180

Chipped stone 2; Ceramics 3

Flakes

Utilized
1 ct

Unutilized
1 qe

Ceramics

2 unidentifiable Mesa Verde Gray Ware, 1 with dark gray paste and unknown temper, 1 lighter gray with possible surface manipulation, white sand temper.

1 probable Moccasin Gray neck sherd (PI); light gray with coarse white sand temper.

5DL181

Chipped stone 11; Sherds 21

Core/chopper	fine qe	8.8, 7.4, 4.2	"Turtle-backed". Dorsal flake removals only, with use on 2 edges. Fig. 5c.

Flakes

Unutilized

4 ct

6 qe

Quartzite (7) 63.6%; Cryptocrystalline (4) 36.4%

Ceramics

3 Moccasin Gray with coarse white sand temper.

18 unidentifiable Mesa Verde Gray Ware. 7 have dark crushed rock and sand temper, 11 have coarse white sand.

5DL187A

Chipped stone 25; Sherds 7

Flakes

Utilized

1 ct — Scraping and chopping.

2 qe

Unutilized

22 qe

Quartzite (24) 96%; Cryptocrystalline (1) 4%

Ceramics

1 Piedra to Cortez Black-on-white sherd (PI-PII).

6 unidentifiable Mesa Verde Gray Ware sherds. All have coarse sand and rock temper.

5DL187B

Chipped stone 28

Tool

biface	qe	5.0, 2.9, .6	Possible knife fragment. Somewhat irregular bifacial retouch. Some wear on intact edge.

Flakes
Utilized
3 qe

Unutilized
17 qe
3 ct
3 cy

Core/chopper - qe   11.1, 7.8, 5.7 Rounded edge. Some cortex remains.

Core   qe   5.4, 5.0, 3.2

Quartzite (22) 78.6%; Cryptocrystalline (6) 21.4%

5DL188A
Chipped stone 31
Flakes
Utilized
5 qe

Unutilized
23 qe
1 ct   Jasper-like.

Core-hammerstone -qe 8.8, 8.5, 5.0 Heavily used. Some remaining cortex.

Core-hammerstone -qe 6.8, 4.8, 3.8

Quartzite (30) 96.8%; Cryptocrystalline (1) 3.2%

5DL188B
Chipped stone 24; Metal 1
Tools
point   iron   4.15, 1.60, .17 Complete. Slightly convex sides taper to the tip. Oblique shoulders join pointed tang base. The sides of the tang have small serrations which would act like barbs to hold the point in a shaft. Both edges of the blade look to have been

		sharpened; the tip is bent, as if by impact. Cropley (1968:6) terms a similar shape "Indian made". Fig. 5d.
graver	cy	2.1, 1.7, .4 Flake with a sharp projection that shows some use; minimal retouch present.

<u>Flakes</u>
<u>Utilized</u>
1 ct — Scraping edge.
7 qe

Unutilized
14 qe

Core/chopper - qe — 7.9, 5.5, 3.1 Bifacial, convex edge.

Quartzite (22) 88%; Cryptocrystalline (2) 8%; Iron (1) 4%

5SM34
Chipped stone 75
<u>Tools</u>
knife tip — qe — 3.3, 3.6, 1.1 Tip of large, thick, symmetrical, bifacially flaked knife with slightly convex sides.

<u>Flakes</u>
<u>Utilized</u>
2 qe
3 crypto

Unutilized
53 qe
16 crypto — Includes 2 red chert or "jasper".

The flakes from this site are predominantly small (lengths of 2.5 cm. and less) and have features such as dorsal ridges, longitudinal curvature, and thinness suggesting much retouching or tool manufacture at the site.

Quartzite (56) 74.7%; Cryptocrystalline (19) 25.3%

5SM37

Chipped stone 14

<u>Flakes</u>

Utilized

2 qe

1 crypto

Unutilized

10 qe

1 crypto

Most flakes are again small, retouch flakes. A core may have been lost from this collection.

Quartzite (12) 85.7%; Cryptocrystalline (2) 14.3%

5SM38

Chipped stone 35

<u>Tools</u>

small biface - cy	1.9, 1.2, .4 Apparently fragmentary; possibly a point fragment, but somewhat irregular. Slight use on one edge.
large biface - qe	10.8, 4.2, 2.4 Possibly part of a chopper. Convex bifacial edge shows rounding and step fracture. Fig. 6a.

<u>Flakes</u>

Unutilized

1 cy

28 qe

All quartzite in the collection is of two similar varieties. Two flake cores showing some use and bifacial flake removals--

qe	6.1, 2.5, .9
qe	5.7, 4.4, 2.1

Quartzite (33) 94.3%; Cryptocrystalline (2) 5.7%

5SM39

Chipped stone 40; Ground stone 2

<u>Tools</u>

scraper	cy	2.0, 2.2, .4 Distal end of flat flake with low dorsal ridge; working edge is steeply retouched. Step fracture and polish are present. Fig. 6b.
chopper	qe	7.6, 6.0, 3.0 Large primary flake. One end has two dorsal flake removals and an associated chopping edge. Opposite end also used.
flake chopper - qe		5.7, 5.6, 1.6 Secondary flake. Heavily used convex distal end (step fracture, rounding) with some probable slight retouch.

<u>Flakes</u>

Utilized

4 crypto	(2 ct, 2 cy)
3 qe	

Unutilized

2 crypto	
24 qe	
4 slt	Three are dark green with lighter inclusions and bedding apparent; may not be siltstone.

<u>Ground</u>

rubbing or grinding stone - qe?

7.2, 7.1, 4.1 Unmodified cobble. One face shows smooth area with latitudinal striation, one end has small pounded area. Surface is slightly vesicular.

<u>Ground</u>

rubbin or grinding stone - felsite porphyry?

8.5, 6.7, 3.8 Unmodified cobble. One face shows lightly polished area; use is slight.

Quartzite (29) 72.5%; Cryptocrystalline (7) 17.5%; Siltstone (4) 10%

5SM40

Chipped stone 17; Hammerstone 1

Tools

point	cy	2.0, 1.4, .3 Tip and base missing. Was notched, probably at the corners. One face completely retouched, one has much unretouched ventral surface remaining. Fig. 6d.
point	qe	3.7, 2.1, .4 (3.7 = axial length; 2.1 = perpendicular.) Tip, one barb, and base missing. Probably corner-notched, with oblique break at base. Fig. 6c.
hammerstone - qe?		10.2, 17.6, 4.8 Cobble. One large flake scar. One end flattened from pounding.

Flakes

Utilized
- 1 ct
- 3 qe

Unutilized
- 7 qe
- 3 slt
- 1 felstie porphyry

Quartzite (10) 58.8%; Cryptocrystalline (3) 17.6%; Siltstone (3) 17.6%; Igneous (1) 5.9%

5SM41

Chipped stone 78; Ground stone 1

Tools

point	qe	1.7, 1.5, .5 Base. Point was either shouldered or corner-notched, base is convex. Irregular bifacial retouch. Fig. 6f.

point	qe	1.6, 1.2, .2 Tip. Small retouch on thin flake, some ventral surface remains.
point	qe	2.1, 1.3, .4 Tip/midsection. Some unmodified ventral flake surface.
knife	qe	2.8, 2.5, .9 Tip. Thick and symmetrical with heavily rounded and dulled edges.
chopper - black qe? (possibly basalt)		6.3, 7.3, 2.3 Flake with dorsal removals and one ventral removal around used edge. Use in three areas, heavy step fracture and rounding on one side. Fig. 6h.
biface	qe	3.9, 3.6, 2.0 Possibly a spent core, though all flake scars are small. Little or no use is apparent. Fig. 6g.

<u>Flakes</u>

Utilized
- 5 qe
- 6 crypto

Unutilized
- 40 qe
- 18 crypto
- 3 slt

The flakes are a wide variety of sizes, types, and materials, implying multiple uses of the site.

Quartzite (51) 65.4%; Cryptocrystalline (24) 30.8%; Siltstone (3) 3.8%

<u>Ground</u>

mano - sandstone	11.9, 8.4, 4.5 Shapped and symmetrical; subrectangular. Has one smooth, rockered face; the opposite face is weathered.

5SM42A

Chipped stone 10

<u>Flakes</u>

Utilized

2 qe

1 crypto

Unutilized

7 qe

Quartzite (9) 90%; Cryptocrystalline (1) 10%

5SM42B

Chipped stone 11

<u>Flakes</u>

Unutilized

10 qe

1 crypto

Quartzite (10) 90.9%; Cryptocrystalline (1) 9.1%

5SM42C

Chipped stone 9

<u>Flakes</u>

Utilized

2 qe

Unutilized

6 qe

1 crypto

Site total (areas are contiguous): 30.

Quartzite (27) 90%; Cryptocrystalline (3) 10%

5SM43A

Chipped stone 61; Ground stone 1

<u>Tools</u>

point	cy	3.85, 2.34, .56 Complete. Triangular blade with straight-sided, square-based stem and very pronounced shoulders. Both sides of the blade show use, and one face is patinated. Fig. 6j.

point	ct	4.76, 2.66, .58 Complete. May also be a knife; edges are irregular with one large notch showing unifacial wear. Wear present in other areas as well, especially near the tip. Deep corner notches, sharp barbs, convex base. Fig. 6i.
point	qe	2.95, 1.65, .33 Nearly complete. Side-notched with straight, eared base. Tip has parallel-sided, constricted projection .35 cm. long which may have been used as a drill or graver. Fig. 6k.
knife	ct	3.0, 3.8, .8 Base. Convex base with bifacial thinning, some apparent use; broken obliquely.
hammerstone	qe	7.1, 5.9, 4.3 One face flat, one highly peaked. Very heavy use around most of the juncture of the two faces. Some dorsal flake removals, but use as a core secondary to that of hammer.
chopper	qe	9.2, 8.7, 2.2 Primary flake with edge scalloped by unifacial flake removals; use not heavy.

<u>Flakes</u>
Utilized
  4 qe
  3 crypto
Unutilized
 35 qe
  8 crypto
  3 slt

core	ct	6.7, 5.1, 2.1 Very irregular, one battered area.

core	qe	8.0, 5.0, 3.1 Flake, some dorsal removals; cortex remains.

Flakes range from medium (about 3.0 to 6.0 cm. length) to large; few smaller flakes present.

Quartzite (43) 70.5%; Cryptocrystalline (15) 24.6%; Siltstone (3) 4.9%

<u>Ground</u>

mano - sandstone	2.6, 7.4, 4.2 Fragment from near one end of probably oval, bifacial, smooth mano.

5SM43B

Chipped stone 18

<u>Flakes</u>

<u>Utilized</u>

4 qe

Unutilized

8 qe

6 crypto

Quartzite (12) 66.7%; Cryptocrystalline (6) 33.3%

5SM44

Chipped stone 25

<u>Tools</u>

point	cy	3.3, 2.0, .54 Midsection. One barb present; probably was corner-notched. Symmetrical, very straight-edged, completely bifacially worked. Heavily used on one edge: bifacial shearing, step fracture, rounding. Unifacial wear on opposite edge. Fig. 7c.
point	qe	2.5, 1.3, .3 Tip. Apparently long, narrow point; broken obliquely.

hafted knife - cy		3.67, 3.6, .67 Base. Very large corner notches with expanding convex base. Basal thinning; somewhat irregular bifacial thinning with half of one face being unretouched bulbar surface. Heavy bifacial use on both edges. Horizontal break with slight scraping use afterbreakage. Fig. 7b.
biface	cy	4.3, 1.2, .68 Very regular bifacial thinning. Pointed tip, one convex side, and convex base present; large longitudinal break. Slight use apparent. Fig. 7a.
biface	qe	2.6, 1.6, .5 Blunt-pointed narrow tip (knife?).
graver	cy	2.6, 1.8, .65 Flake with sharp projection showing some wear.

Flakes

Utilized

1 qe

Unutilized

14 qe

3 crypto

1 slt

Quartzite (17) 68%; Cryptocrystalline (7) 28%; Siltstone (1) 4%

5SM45A

Chipped stone 30; Ground stone 1

Tools

point or knife - cy		2.7, 1.7, .34 Tip. Regular, small, bifacial retouch, sides slightly convex.
knife	qe	2.5, 2.7, .8 Base. Convex, with irregular bifacial retouch, horizontal break.

biface	cy	1.7, 2.7, .7 Possible knife base. Has two concave used areas, one convex.
biface	qe	5.7, 3.1, 1.7 Thick and irregularly thinned. One edge shows probable chopping use. Possible preform. Fig. 7d.

<u>Flakes</u>

Utilized

6 qe — Mostly large

4 ct

1 slt

1 basalt (black qe?)

Unutilized

5 qe

4 crypto

1 basalt (?)

2 slt

core	qe	6.6, 6.3, 4.8 Flakes from two faces, battered edge, cobble cortex remaining.
core	ct	4.4, 4.1, 2.1 Disc-like, unused.

Quartzite (14) 46.7%; Cryptocrystalline (11) 36.7%; Siltstone (3) 10%; Basalt (2) 6.7%

<u>Ground</u>

mano	qe	9.4, 8.3, 2.8 Unmodified cobble with one smooth, ground face. Cortex has natural pitting.

5SM45B

Chipped stone 7

<u>Flakes</u>

Utilized

1 qe

Unutilized

5 qe

1 crypto

5SM46

Chipped stone 59

Tools

end scraper	ct	4.4, 2.9, 1.45 Flake with very steeply retouched (90°+) distal end. Extreme use at distal and (heavy step fractures undercut retouch) with much use on sides as well. Fig. 7f.
scraper	qe	5.0, 3.9, .9 Flake. Dorsal retouch, some step fracture and rounding, especially on one side.
knife	cy	2.1, 2.7, .8 Base. Convex, nearly horizontal break.
biface	qe	4.1, 3.9, .9 Irregular oval. Small retouch flakes around entire edge, with some rounding apparent.
blade	ct	5.1, 2.6, .7 Thin, straight edge has continuous dorsal step fracture. Otherwise unmodified. Fig. 7e.

Flakes

Utilized
- 3 qe
- 2 crypto
- 1 slt

Unutilized
- 35 qe
- 12 crypto — Primarily small retouch flakes.

core?	ct	4.1, 4.2, 3.3 Planar faces with one flake removal. Two 90° chopping edges.

Quartzite (40) 67.8%; Cryptocrystalline (18) 30.5%; Siltstone (1) 2.7%

5SM47

Chipped stone 38; Ceramics 3; Baking soda and coffee tin lids 3

Tools

point	ct	("yellow jasper") 3.4, 1.3, .38 Complete. Straight, converging edges, side notches, square base. Similar to PII-PIII projectiles. Some use apparent. Fig. 7h.
knife	qe	3.4, 3.5, .6 Base. Straight base with nearly straight sides diverging from corners. Fig. 7g.

Flakes

Utilized
- 5 crypto
- 2 qe

Unutilized
- 13 qe
- 13 crypto
- 2 slt

core/chopper - qe	9.3, 7.7, 4.5 Cobble with flakes removed to form bifacial edge showing some use.

Quartzite (17) 44.7%; Cryptocrystalline (19) 50%; Siltstone (2) 5.3%

Ceramics

2 corrugated. One is a Mancos Corrugated rim sherd with a nubbin on the rim fillet. Temper is very coarse sand, paste light gray. The other is a heavily burned, unclasssifiable body sherd.

1 unidentifiable Mesa Verde Gray Ware sherd with sand temper, gray paste.

5SM48

Chipped stone 17

Flakes

Utilized
- 1 qe
- 1 crypto

Unutilized
11 qe
4 crypto

Quartzite (12) 70.6%; Cryptocrystalline (5) 29.4%

5SM49

Chipped stone 59; Ceramics 1

Tools

point	qe	3.3, 1.54, .63 Blade; tip and base missing. Large, corner-notched, with very slightly convex sides, and fairly regular bifacial thinning. Fig. 7k.
point	qe	2.45, 1.40, .44 Tip missing. Side to corner-notched with one wide, concave notch and one narrower; expanding straight base. Completely bifacially retouched. Fig. 7i.
knife/biface -	qe	4.7, 2.8, .7 Complete. Has pronounced longitudinal curvature but is completely bifacially retouched. Edges show cutting use. Fig. 7j.
knife/biface -	cy	3.7, 3.8, 1.1 Base (?). Straight sides converge to sharp convex base; one edge used.
biface	qe	3.3, 4.7, .9 Irregular bifacial retouch on two edges of truncated flake.
knife	qe	2.5, 3.0, .95 Base. Straight base with rounded corners.

Flakes

Utilized
2 qe
5 crypto
1 slt

Unutilized
29 qe
15 crypto — Many small retouch flakes.

core/hammer qe — 7.0, 5.0, 2.7 Two tabular faces, one face with flake removals and well-used edge.

Quartzite (37) 62.7%; Cryptocrystalline (21) 35.6%; Siltstone (1) 1.7%

Ceramic

1 Mesa Verde White Ware sherd, the thickness and slipped surface suggest a later date for this piece (PII-III).

5SM50

Chipped stone 58; Sandal 1

Tools

point	qe	3.66, 1.78, .53 Nearly complete with portion of base missing. Corner-notched with straight-sided blade, some bulbar surface remaining. Fig. 9a.
chopper	ct	5.1, 5.4, 2.55 Bifacial and unifacial retouch and use on thick flake.

Flakes

Utilized
9 crypto
2 qe

Unutilized
29 qe
16 crypto

Collection includes an unusual number of struck blades.

Quartzite (32) 55.2%; Cryptocrystalline (26) 44.8%

Sandal (analysis by Kellie Masterson)
18.0, 10.2, .65 (4.7 wide at heel, 3.8 thick)

Coarse twilled weave (Kidder and Guernsey 1919 Type Ial). Heel and middle portion present with the front third missing. The sandal is made from narrow leaf yucca, both split and whole, woven 11 strands wide, over 2 and under 2. The heel has been cupped by square-knotting the outermost strands and then tying 4 central strands over the first 2 knots; a juniper bark pad is still present in the heel. One side loop for tying the sandal to the foot also remains. The heel is slightly worn. Fig. 8.
This sandal is most similar to PIII sandals, though PI-PII sandals are little known. It is not like most known "Archaic" sandals from the vicinity (Hurst 1945, 1947, 1948) or elsewhere. Sandals very similar to this one are known from the Glen Canyon (Lipe 1960: 201-3). There are strong Mesa Verde Anasazi associations with the Glen Canyon specimens.

5SM55

Chipped stone 39

<u>Tools</u>		
chopper	qe	8.3, 5.4, 1.8 Flake with bifacial edge, with rounding and step fracture.
biface	qe	4.5, 5.3, 1.0 Flake with convex bifacial edge with use.
<u>Flakes</u>		
Utilized		
7 qe		
2 crypto		
Unutilized		
22 qe		
6 crypto		Many large flakes.
core	ct	6.8, 6.6, 3.2 Flakes removed from two faces around an edge; no use apparent.
core	cy	10.1, 6.6, 3.8 Flake removals from one edge.

Quartzite (31) 79.5%; Cryptocrystalline (8) 21.0%

5SM56

Chipped stone 26

Tool

knife	ct	5.6, 2.2, .78 Tip and portion of blade. Straight-sided, sharp-pointed, with regular, oblique bifacial scars; some wear. Fig. 9b.

Flakes

Utilized

2 crypto

Unutilized

13 qe

10 crypto

All but two are very small retouch flakes.

Quartzite (13) 52%; Cryptocrystalline (12) 48%

5MN433

Chipped stone 24

Flakes

Utilized

4 qe

2 crypto

Unutilized

10 qe	Mostly very large.
6 crypto	All medium to small.
1 slt	

core-hammerstone - qe

6.5, 6.4, 5.0 Flake removals from three different faces; four to five pounded edges.

Cores, hammerstones, and possible manos were observed but not collected.

Quartzite (15) 62.5%; Cryptocrystalline (8) 33.3%; Siltstone (1) 4.2%

5MN434A

Chipped stone 21

Tool

point	ct	1.58, 1.09, .24 Tip missing. Side-notched near base with oblique notches forming expanding base and small flaring barbs. Base and sides nearly straight. Fig. 9c.

Flakes

Utilized
- 3 crypto
- 1 qe

Unutilized
- 13 qe
- 2 crypto
- 1 slt

Quartzite (14) 66.7%; Cryptocrystalline (6) 28.6%; Siltstone (1) 4.8%

5MN434B

Chipped stone 9

Tool

chopper	qe	10.6, 9.2, 4.5 Largely unmodified chunk of material with long, somewhat used edge. Two flake removals. Cortex present.

Flakes

Utilized
- 1 cy
- 1 qe

Unutilized
- 5 qe

core/scraper - qe		10.1, 8.7, 4.3 Also large chunk of material. Flake removals, two faces from one edge; edge has unifacial wear.

5MN435

Chipped stone 10; Ground stone 1, Hammerstone 1

Tools

hammerstone - qe	6.6, 5.9, 4.4 Hand-sized and shaped mostly natural edge. Use area is backed by shiny cortex with an area of possible very light use.

Flakes

Utilized
- 2 cy
- 1 slt

Unutilized
- 6 qe
- 1 slt

Quartzite (7) 63.6%; Cryptocrystalline (2) 18.2%; Siltstone (2) 18.2%

Ground

mano - sandstone	16.9, 9.1, 4.1 Outline mostly natural, but subrectangular; both ends are pounded flat. Both faces are extensively used; one face is smooth and rockered, the other pecked and flatter.

5MN436

Chipped stone 13

Flakes

Utilized
- 1 qe
- 1 slt

Unutilized
- 7 qe
- 4 slt

Quartzite (8) 61.5%; Siltstone (5) 38.5%

5MN437A

Chipped stone 17

Tools

"scraper" - slt	7.3, 5.8, 2.9 Large primary flake (or ½ cobble) with large dorsal flake removals at both ends. Edges thus created show light to heavy scraping use. Fig. 10a.
"scraper" - slt	6.7, 5.6, 1.15 Flake with dorsal retouch at distal end. Most use (step fracture and rounding) is dorsal with possible use 1 unretouched ventral area.
"scraper" - qe	9.5, 8.9, 1.3 Flake with one side dorsally retouched and used unidirectionally, probably for same task as the other two scrapers from this site.

Flakes

Utilized
- 4 qe

Unutilized
- 6 qe
- 3 igneous — Two basalt, one andesite (?)
- 1 slt

All flakes are large.

Quartzite (11) 64.7%; Siltstone (3) 17.6%; Igneous (3) 17.6%

5MN437B

Chipped stone 7

Tool

"scraper" qe	6.1, 4.7, 2.2 Flake with steep dorsal flake removals on one side edge; edge shows heavy use.

Flakes

Utilized
- 2 qe — (One is possibly a small hammerstone.)
- 1 cy

Unutilized
  2 qe
  1 diorite (?)

5MN438
  Chipped stone 24
    Flakes
    Utilized
      1 qe
      2 crypto
    Unutilized
     14 qe
      6 crypto
      1 slt

core	cy	5.9, 4.7, 2.7 Bifacial flake removals from around most of an edge. Chopping and hammering use both apparent.

Quartzite (14) 58.3%; Cryptocrystalline (9) 37.5%; Siltstone (1) 4.2%

5MN439
  Chipped stone 23
    Tool

chopper	qe	9.4, 10.2, 2.6 Very large primary flake with some dorsal and some bifacial flake removals around all edges. Nearly whole circumference is used, in some areas heavily. Fig. 9d.

    Flakes
    Utilized
      1 ct
    Unutilized
     11 qe
      6 ct
      2 slt
      1 igneous

core	qe	6.3, 6.2, 2.5 Cobble with two large flake scars, several smaller; possible slight use.
core	ct	4.1, 3.0, 1.9 Small, probably "spent"; flake scars overall.

Quartzite (12) 52.2%; Cryptocrystalline (8) 34.5%; Siltstone (2) 8.7%; Igneous (1) 4.3%

5MN440A

Chipped stone 23; Ground stone 1

Tools

point?	qe	2.4, 1.3, .3 Complete. Triangular with convex base, nearly straight sides and sharp convex tip. Dorsal face completely retouched with small scars; much unretouched on ventral face. Fig. 9f.
scraper	qe	5.8, 5.3, 2.7 Primary flake with one distal corner dorsally steeply retouched; this and the adjacent side have been used.
side scraper - slt		7.3, 5.6, 1.25 Secondary flake with dorsal retouch and wear. Fig. 9e.

Flakes

Utilized
- 2 qe
- 2 slt
- 1 cy

Unutilized
- 7 qe
- 3 slt
- 3 crypto

core/chopper - qe		8.5, 6.2, 4.1 Flakes removed from one face only leaving moderately used edge backed by cortex.

core	slt?	5.5, 4.6, 3.0 Flakes removed from two faces from common edge. Some pounding apparent.

Quartzite (12) 52.2%; Cryptocrystalline (4) 17.4%; Siltstone (7) 30.4%

<u>Ground</u>

mano - sandstone — 8.5, 8.4, 3.8 About half missing and found broken <u>in situ</u>. Outline apparently unmodified and oval. Large spall missing from end suggests pounding use. Both faces used and pecked. One face is more heavily used and more nearly flat.

5MN440B

Chipped stone 12; hammerstone 1

<u>Tools</u>

chopper/perforator/core - qe — 10.1, 8.3, 3.8 Flat cobble with unifacial and bifacial flake removals around most of natural edge. Amount of use of prepared edge ranges from little to heavy. One end has 1.0, 1.5, .9 projection with heavy wear around base. Fig. 10b.

hammerstone qe — 9.2, 6.9, 5.5 Dense cobble with numerous pounded faces and edges, two possible flake scars.

<u>Flakes</u>

Utilized
- 2 qe — Both very large.
- 1 ct

Unutilized
- 1 qe
- 5 crypto
- 2 slt

Quartzite (5) 38.5%; Cryptocrystalline (6) 46.2%; Siltstone (2) 15.4%

5MN441A

Chipped stone 18

Tools

point	ct	2.59, 1.64, .39 Tip missing. Corner-notched with expanding straight base and straight serrated sides. Completely bifacially worked. Slight use present. Fig. 10d.
knife	ct	5.2, 2.8, .7 Tip and base missing. Symmetrical and parallel-sided with regular bifacial retouch. Both sides used. Fig. 10c.

Flakes

Utilized

- 1 qe

Unutilized

- 11 qe
- 1 cy
- 2 igneous — Diorite?

core	qe	7.4, 5.1, 3.4 Mainly unifacial removals from one edge; edge used unidirectionally.

Quartzite (13) 72.2%; Cryptocrystalline (3) 16.7%; Igneous (2) 11.1%

5MN441B

Chipped stone 6; Ground stone 1

Flakes

Utilized

- 1 qe
- 1 slt — Scraper-like.

Unutilized

- 2 qe
- 1 ct

core/hammer	qe	13.5, 12.6, 9.6 Extremely large cobble with flake removals from four faces, one long edge showing pounding. Cortex remains.

Ground

grinding stone/mano - sandstone

10.6, 8.5, 4.2 Unmodified cobble, broken straight across at one end. May have been used after breakage. One very smooth convex ground face, opposite face possibly ground. Appears burned.

5MN442A

Chipped stone 20

Tool

biface qe — 7.5, 3.9, 1.3 Complete. Flake with primarily dorsal shaping and thinning, some ventral retouch on one side. Bifacial edge has bifacial use, opposite edge unifacial use. Knife shaped. Fig. 10e.

Flakes

Utilized

3 qe — (One with dorsal use; possible hammerstone spall.)

Unutilized

10 qe

3 slt

Most flakes in this collection are large.

core - black qe (igneous?)

11.8, 8.7, 4.9 Flake scars all faces. Removals mainly from one continuous edge. This edge shows some use.

core - black qe (igneous?)

Overall flake scars. Same technique of removal as immediately above, with some use on main edge.

core	cy	10.3, 7.7, 2.8 Very large primary flake with 3-4 flake scars on ventral face. No use shows.

Quartzite (16) 80%; Cryptocrystalline (1) 5%; Siltstone (3) 15%

5MN442B

Chipped stone 25; Ground stone 2

Tools

biface	qe (basalt?) 5.6, 3.9, 1.7	Irregular bifacial retouch around edges of a flake. One side shows bifacial use, the opposite side shows dorsal use.
chopper	slt	8.6, 6.9, 2.2 Oval secondary flake. Little retouch, but most of the circumference shows extensive rounding and step fracture.

Flakes

Utilized
- 2 qe

Unutilized
- 11 qe
- 5 crypto
- 3 slt
- 1 igneous - felsite

core	qe	7.6, 6.0, 4.2 Flake removals from two faces which have a common edge; one scar is on one of the faces, and a series of scars are on the opposite face. One end of the item is pounded.

Quartzite (15) 60%; Cryptocrystalline (5) 20%; Siltstone (4) 16%; Igneous (1) 4%

Ground

mano - sandstone		13.1, 9.6, 5.6 Unmodified oval cobble. One much used face with both pecked and smooth areas; this face is slightly convex. Opposite face much weathered; may have been slightly used.
mano	qe	9.9, 8.1, 2.35 Fragment, about half of grinding surface and the opposite face are missing. Probably shaped, subrectangular. Face present is very slightly convex and is pecked.

5MN443

Chipped stone 19

Tool

biface	qe	8.1, 5.1, 1.5 Flake, one side and distal end bifacially retouched. Both show use, that on the side being heavier. Fig. 10f.

Flakes

Utilized
- 2 qe
- 1 slt

Unutilized
- 7 qe
- 5 slt
- 1 igneous - diorite

Most flakes are medium to large size.

core/hammer	slt	8.1, 6.1, 5.4 Cobble truncated at bedding plane. Some flake scars and slight use at truncation.

Quartzite (10) 52.6%; Siltstone (8) 42.1%; Igneous (1) 5.3%

5ME165 - No collection

5ME166

Chipped stone 37

Tools

knife	qe	4.9, 2.9, .7 Tip and base missing. Symmetrical and regularly flaked completely on both faces. Both edges worn, rounded. Fig. 11b.
knife	qe	3.3, 3.2, .74 Tip and base missing. Completely bifacially worked. Some use on both edges.
biface	qe	9.0, 5.8, .9 Truncated at both ends. Quite symmetrical and uniformly thick; both faces completely retouched with fairly large though thin and well-controlled flakes. Some, though not heavy, step fracture and rounding both edges. Could be classified as a very large knife. Fig. 11c.
biface/chopper -	qe	14.5, 9.5, 3.0 Bifacially thinned for a little more than half the circumference of a large flake. Thinned edge shows wear (rounding, small step fracture) especially on the two sides. Fig. 11a.

Flakes

Utilized

7 qe

3 crypto

Unutilized

21 qe	Many of these are the same dark green qe as tools 2-4 above.
2 crypto	

Quartzite (32) 86.5%; Cryptocrystalline (5) 13.5%

5ME167 - No collection

5ME168
Chipped stone 12
Flakes
Utilized
3 crypto
Unutilized
5 crypto
3 qe
1 slt

All but two items are small (less than 4.0 cm. length).

Quartzite (3) 25%; Cryptocrystalline (8) 66.7%; Siltstone (1) 8.3%

5ME169
Chipped stone 20
Tool

knife	qe	4.0, 2.9, .7 Tip. Regular, complete bifacial retouch. Light use apparent.

Flakes
Utilized
1 qe
1 black qe or basalt. Scraping edge.
Unutilized
9 qe
3 slt
5 igneous, andesite and felsite?

Quartzite (12) 60%; Siltstone (3) 15%; Igneous (5) 25%

5ME170
Chipped stone 33
Flakes
Utilized
4 crypto
2 qe

Unutilized
25 qe
1 ct
1 obsidian

Quartzite (27) 81.8%; Cryptocrystalline (5) 15.1%; Obsidian (1) 3.1%

5ME171

Chipped stone 22

Tools

biface/knife - ct		3.5, 2.9, .8 Knife tip? Bifacial flaking around edge. One side shows heavy step fracture unifacially, opposite side shows less. Convex tip is rounded and highly polished with microscopic striations perpendicular to the edge.
scraper	qe	5.9, 6.1, 2.6 Flake with some retouch and heavy step fracture on one steep side. Fig. 12a.

Flakes

Utilized
1 qe
1 ct
1 slt

Unutilized
11 qe
4 slt
2 crypto

Quartzite (13) 59.1%; Cryptocrystalline (4) 18.1%; Siltstone (5) 22.8%

5ME172A

Chipped stone 37; Ground stone 1

Flakes

Utilized
1 qe
2 slt
1 ct

Unutilized
19 qe
10 slt
3 crypto

core	slt	5.2, 3.8, 1.7 Close to spent. Bifacial flake removals from a common edge which shows slight use.

Quartzite (20) 54%; Cryptocrystalline (4) 10.8%
Siltstone (13) 35.1%

Ground

mano - sandstone	11.0, 7.1, 2.7 Oval with one face undefinable either from weathering or breakage. Sides appear to have been chipped to shape, though one end is over 1.0 cm. wider than the other. Wider end is pounded. Ground face is smooth and nearly flat.

5ME172B
Chipped stone 20
Flakes
Utilized
2 qe
1 slt
Unutilized
9 qe
1 ct?
6 slt

core	slt	8.4, 3.7, 3.2 Flake scars on one and possibly two faces. Steep edge with scars has unifacial step fracture, slight rounding.

Quartzite (11) 55%; Cryptocrystalline (1) 5%;
Siltstone (8) 40%

5ME173 (Areas A and B combined)
Chipped stone 22

Tools
hammerstone/chopper - qe
10.2, 6.5, 5.0 Truncated cobble with heavy battering on entire non-truncated mostly natural edge (appears to have been broken after or during use). Some large bifacial removals at one end.

chopper	qe	9.1, 5.7, 2.9 Rough convex edge has bifacial working, step fracture and rounding.

Flakes
Utilized
3 qe
Unutilized
14 qe
1 slt

core	qe	6.8, 4.8, 4.1 Circumferential flake removals from tabular (cortex?) face. No use apparent.
core	qe	5.5, 6.6, 3.0 Large flake with small bifacial removals from common edge. Slight use of edge.

Quartzite (21) 95.4%; Siltstone (1) 4.6%

5ME174A
Chipped stone 19
Tools

"scraper	slt(?)	6.5, 6.8, 2.5 Flake with thick distal end which is regularly dorsally retouched and shows shearing and small step fracture. Some dorsal use on one side as well. Fig. 12b.

"side scraper" - qe		5.0, 3.2, 1.5 Secondary flake with both lateral sides used. Thinner side has mostly dorsal, small retouch and step fracture; opposite is steep with bifacial retouch and rounding. Fig. 12e.
"side scraper" - qe		7.3, 4.1, 2.1 Primary flake with both sides ventrally retouched and showing step fracture. Dorsal side horizontally highly curved. Fig. 12d.
chopper/scraper - qe		8.3, 5.3, 1.3 Secondary flake. One side with small bifacial retouch, step fracture, rounding. Steep opposite side has much dorsal step fracture.

Flakes
Utilized
2 slt
Unutilized
8 qe
4 slt
1 igneous - diorite

All flakes are medium to large sized.

Quartzite (11) 57.9%; Siltstone (7) 36.8%; Igneous (1) 5.3%

5ME174B - No collection

5ME175
Chipped stone 27
Tool

chopper	qe	6.4, 5.2, 2.0 Primary flake with slight bifacial retouch of one side. This side is battered; one area of the opposite side shows similar wear.

Flakes
Utilized
4 qe
Unutilized
12 qe
7 slt
3 crypto — All small.

Quartzite (17) 63.0%; Cryptocrystalline (3) 11.1%;
Siltstone (7) 25.9%

5ME176 - No collection

5ME177
Chipped stone 17
Flakes
Utilized
3 qe
1 ct
1 slt (?)
Unutilized
9 qe — Mostly large.
1 ct
2 slt

Quartzite (12) 70.6%; Cryptocrystalline (2) 11.8%;
Siltstone (3) 17.6%

5ME178
Chipped stone 12, Hammerstone 1
Tool
hammerstone qe — 17.3, 8.3, 5.1 Elongate cobble with one battered end. Opposite end and one side are naturally quite thin and show some battering and five larger flake scars.

Flakes
Unutilized
7 qe — All medium to large sized.
2 crypto
1 slt

core	slt	10.3, 8.1, 4.0 Cobble with flake removals from opposite faces; one scalloped edge shows chopping use.
core	slt	4.2, 7.6, 2.1 Flake with some removals from both faces; one edge shows scraping use.

Quartzite (8) 61.5%; Cryptocrystalline (2) 15.4%; Siltstone (3) 23.1%

5ME179
Chipped stone 20
<u>Tool</u>

point	cy	2.38, 1.55, .34 Tip missing. Side-notched with indented base and straight sides. Completely bifacially worked. Concave chip from one side and opposite side show light unidirectional use. Fig. 12c.

<u>Flakes</u>
<u>Utilized</u>
5 qe
1 slt
1 igneous - basalt (?)
Unutilized
7 qe
1 ct
3 slt
1 basalt (?)

Most of the flakes are large.

Quartzite (12) 60%; Cryptocrystalline (2) 10%; Siltstone (4) 20%; Igneous (2) 20%.

42GR584
Chipped stone 1
<u>Tool</u>

knife	qe	7.7, 3.2, .65 Complete. Straight, symmetrical sides with convex (nearly tanged)

		base. Small, regular bifacial retouch on all edges with some possible unretouched areas on both faces toward the center. The piece has a slight longitudinal curvature. Both sides show bifacial step fracture and rounding (i.e., cutting use) above the shoulders; there is little or no wear on the base. The tip is very sharp and has a small projection which is rounded and sheared--it could have been used as a graver. Fig. 13a.

42GR585A

Chipped stone 32, Hammerstone 1

Tool

hammerstone	ct	8.5, 7.3, 4.1 Nodule of variegated material similar to some of the flakes in the collection. Heavy pounding present around natural edge. No apparent intentional flake removals.

Flakes

Utilized

1 qe

2 crypto

Unutilized

26 crypto	All but four are small retouch flakes.
1 igneous - diorite?	

core	qe	6.9, 5.1, 3.2 Bifacial flake removals from common edge; edge shows some use.
core	cy	5.0, 4.8, 1.2 Flake with some removals on both faces; edge somewhat used.

Quartzite (2) 6.1%; Cryptocrystalline (30) 90.1%; Igneous (1) 3.8%

42GR585B

Chipped stone 13

Tool

point	qe	2.1, 3.0, .74 Probable mid-section. Roughly bifacially worked with lenticular cross-section. Probably corner-notched with large barbs perpendicular to the axis. Possible use on both sides. Fig. 13b.

Flakes

Utilized

2 crypto

Unutilized

9 crypto	Mostly small and of similar red material.
1 qe	

Quartzite (2) 15.9%; Cryptocrystalline (11) 84.6%

42GR586

Chipped stone 26

Tool

knife	ct	1.8, 2.0, 1.5 Base. Convex with both faces completely retouched. Projections have very small step fracture and show rounding on both sides. Material is highly lustrous. Fig. 13c.

Flakes

Utilized

3 crypto

Unutilized

14 crypto

4 qe

3 slt

1 diorite

Quartzite (4) 15.4%; Cryptocrystalline (18) 69.2%; Siltstone (3) 11.5%; Igneous (1) 3.8%

42GR587

Chipped stone 22

Tools

knife	cy	.7, 1.2, .27 Tip fragment.
scraper	cy	2.2, 2.9, 1.0 Distal end of flake with dorsal ridge. End has been dorsally steeply retouched and shows shearing, rounding, polish and much step fracture. Fig. 13d.
hammerstone - qe (ct?)		8.3, 6.5, 4.3 Cobble with several flake removals from one end forming blunt edge. Pounded area extends across this edge and on to natural edge. May also be a core. Fig. 13e.
chopper	slt	13.4, 9.2, 4.3 Cobble with one face cortex, one flake scar or natural breakage. One end has bifacial edge with some use apparent.
chopper	qe	13.1,9.0, 4.2 Primary flake with bi- and unifacial edge showing light use.

Flakes

Utilized
- 1 ct
- 1 basalt (?)

Unutilized
- 11 crypto
- 2 slt
- 1 qe

core	cy	7.2, 4.3, 2.2 Nodule fragment with very irregular flake removals

Quartzite (3) 13.6%; Cryptocrystalline (15) 68.2%; Siltstone (3) 13.6%; Igneous (1) 4.5%

42GR588A

Chipped stone 13

<u>Flakes</u>

Utilized

2 slt

1 qe

Unutilized

6 slt

2 crypto

1 qe

core	slt	10.7, 6.4, 4.2 Cobble with flake removals from one end and one face only. Resultant edge was used.
core	cy	14.1, 8.0, 5.6 Nodule with large flake scars on two faces. Little or no use visible.

Quartzite (2) 15.4%; Cryptocrystalline (3) 23.1%; Siltstone (8) 61.5%

42GR588B

Chipped stone 8

<u>Flakes</u>

Utilized

2 slt

Unutilized

2 ct

1 qe

core	slt	9.3, 8.0, 5.2 Cobble with bifacial flake removals from a common edge. The edge shows some chopping use.
core	slt	8.3, 5.1, 2.1 Tabular piece with one face with flake scars. Used on one side.
core	slt	9.2, 6.0, 2.0 Flat cobble with most cortex removed from both faces. The irregular bifacial edge shows transverse use in two concave areas.

42GR589 - Collection lost

42GR590A

Chipped stone 31

Tool

borer?/scraper - ct	4.0, 2.4, 1.0 Pointed flake with dorsal retouch and step fracture to the tip on one side, central retouch and similar wear on the other side. The used edges are about the same length and steepness. The flake may have been used in a counter-clockwise rotary fashion. Opposite end is heavily battered. Fig. 13f.
Flakes	
Utilized	
3 crypto	
1 slt	
Unutilized	
24 crypto	Almost all smaller flakes of red and white chalcedony and red chert.
1 qe	
core/chopper - ct	10.1, 7.0, 3.7 Nodule with small bifacial removals and some utilization around the perimeter.
core ct	4.9, 6.3, 3.1 Flake with several dorsal scars. Not used.

Quartzite (1) 3.2%; Cryptocrystalline (29) 93.5%; Siltstone (1) 3.2%

42GR590B

Chipped stone 17

Flakes

Unutilized

16 crypto	The majority are very small.
1 qe	

Quartzite (1) 5.9%; Cryptocrystalline (16) 94.1%

42GR591

Chipped stone 33; Ceramics 1

Flakes

Utilized

2 crypto

Unutilized

28 crypto		All medium to small; variety of materials.
2 slt?		
"core"	ct	5.8, 3.7, 2.1 Minimally reduced small nodule.

Cryptocrystalline (31) 93.9%; Siltstone (2) 6.1%

Ceramics

1 sherd, in four pieces, identified as Tusayan Gray Ware. The surface is a light yellow but this may be from weathering as the core is gray in fresh breaks with some carbon streak near outside. The temper is coarse quartz sand. There are a number of triangular indentations on the outer surface which may be obliterated corrugations but appear more likely to be surface manipulation with finger-nail or a sharp object. .53 cm. thick.

42GR592A

Chipped stone 25

Flakes

Utilized

2 crypto

Unutilized

21 crypto

core	cy	6.4, 6.5, 4.3 Flakes removed from three faces with common end which is one large scar. No use apparent.
core	cy	6.0, 6.0, 3.0 Flake removals primarily from one face. No utilization.

Cryptocrystalline (25) 100%

42GR592B

Chipped stone 12

Flakes

Unutilized

12 crypto		All red and gold chert.

42GR593A

Chipped stone 15

Tools

scraper	ct	7.7, 5.5, 1.6 Flake with one tabular face. One steep side is retouched and shows step fracture and other wear for its entire 7.0 cm. length. The opposite side has similar unifacial wear adjacent to bifacial step fracture and shearing adjacent to further unifacial wear, suggesting both scraping and cutting uses of the edge. The latter edge is also retouched. The material is fairly shiny and the tool is slightly weathered or dust-polished. Fig. 13g.
scraper	cy	2.9, 2.5, 1.1 Flake with one tabular face. Opposite face has steep edge with small retouch and mostly unifacial small step fracture and shearing.

Flakes

Utilized

2 cy

Unutilized

8 crypto

1 qe

core/chopper	- qe	9.5, 9.4, 6.3 Cobble with series of larger flakes, all struck from the same natural face, removing about 2/3 of the cortex. The steep resultant edge has large unifacial step fractures. This edge is backed by a smooth cortical area.

core cy 7.7, 5.7, 2.7 Nodule with several bifacial flake removals along one edge. The opposite, natural edge is battered.

Quartzite (2) 13.3%; Cryptocrystalline (13) 86.7%

42GR593B

Chipped stone 6

Flakes

Utilized

1 ct

Unutilized

4 crypto

core cy 7.5, 4.6, 2.9 Large flake with random flake removals of various sizes from three dorsal faces.

42GR594A

Chipped stone 115

Tool

knife cy 2.6, 2.8, .4 Tip of apparently broad and symmetrical knife. Regular bifacial thinning most of both faces. Use present on both sides.

Flakes

Utilized

2 crypto

Unutilized

107 crypto Vast majority are small and thin.

2 slt

1 qe

core cy 5.7, 4.8, 2.1 Flake removals from common edge, mostly from one face; unused.

core cy 4.8, 7.2, 2.2 Secondary flake with some dorsal flake scars. Unused.

Quartzite (1) 0.7%; Cryptocrystalline (112) 97.4%
Siltstone (2) 1.7%

42GR594B

Chipped stone 9

Tool

"scraper"	slt	9.6, 8.0, 2.1 Flake with many dorsal scars, apparently from removals prior to detachment of this flake. One side has much dorsal step fracture and shearing; proximal end has some of the same. Possibly a chopper.

Flakes

Utilized

1 cy		Battered in two areas.

Unutilized

6 cy

core	cy	8.5, 5.7, 4.3 Nodule with flake removals from four faces. Unused.

42GR595

Chipped stone 23

Flakes

Utilized

2 crypto

Unutilized

18 crypto		Four are very large, the rest medium size.
1 slt		
1 qe		

core	cy	5.5, 4.5, 3.5 Four flake removals from four faces. Unused.

Quartzite (1) 4.3%; Cryptocrystalline (21) 91.3%;
Siltstone (1) 4.3%

APPENDIX B

Isolated Artifacts, 1975

DOLORES COUNTY

I.A. #1
One utilized chert flake and two isolated flakes (siltstone and quartzite). All were found on a gently sloping east-facing riverside terrace and talus base on the west side of the Dolores River approximately 1½ miles downstream from the Dolores River Ranch.
Doe Canyon Quad. T.39N, R.17W, NW¼ of the SW¼, Section 4. Elevation 6480 feet.
June 19, 1975.

I.A. #2
One large biface core and two isolated quartzite flakes; the core was not collected. The items were located at the base of a steep, rocky talus slope just above the flood plain of the Dolores River. The area is directly below 5DL89 and 90 (Breternitz 1971) which are 500 vertical feet above on the canyon rim.
Doe Canyon Quad. T.40N, R.17W, SW¼ of SW¼, Section 33. Elevation 6480 feet.
June 20, 1975.

I.A. #3
Two brown quartzite flakes found in a shallow overhang. The overhang is on the east side of the Dolores at a sharp bend of the river just below the entrance of Five Pine Canyon. The shelter faces south and overlooks the large bowl formed by the entrance of the side canyon. The floor of the overhang is washed, and there are no other signs of human use present. Material similar to the flakes is present in the vicinity.
Doe Canyon Quad. T.40N, R.17W, NW¼ of NW¼, Section 27. Elevation 6180 feet.
June 20, 1975

I.A. #4
Biface found on the fairly steep slope between Glade Canyon and the blue line drainage just upstream on the east side of the Dolores River. There is a small flat area on the point ridge just above where the item was found, but no other material was present.
Secret Canyon Quad. T.41N, R.17W, NE$\frac{1}{4}$ of the SE$\frac{1}{4}$, Section 17. Elevation 6460 feet.
June 21, 1975.

biface/knife - qe	5.0, 3.35, .68 Leaf-shaped, complete. Both faces completely retouched and both edges show bifacial step fracture and rounding. Fig. 53.

I.A. #5
Apparent flake. The material is similar to quartzite though it has small vesicles throughout. Curved edge has probable bifacial shearing. The item was found on a bench on the west side of Secret Canyon, about 500 m. up the canyon from the Dolores River. Two possible flakes were observed in the vicinity.
Secret Canyon Quad. T.41N, R.18W, SW$\frac{1}{4}$ of the NW$\frac{1}{4}$, Section 26. Elevation 6420 feet.

SAN MIGUEL COUNTY

I.A. #6
Biface, point or knife, two quartzite flakes. All were found on a sloping spur above the Dolores, on its east side. The only other cultural indication was a small flake observed two spurs to the south.
Joe Davis Hill Quad. T.42N, R.18W, SW$\frac{1}{4}$ of the NE$\frac{1}{4}$, Section 12. Elevation 5860 feet.
June 23, 1975

biface	qe	5.3, 3.5, 1.2 Complete. Bifacially completely retouched, though somewhat irregular. Both sides show wear, one more than the other. Similar to I.A. #4. Fig. 5f.

point (?) - qe		1.9, 1.3, .26 Triangular, with one corner missing. Bifacially worked with some ventral surface remaining. Basally thinned base is slightly concave. Possible light wear on one side. Fig. 5g.

I.A. #7

One small projectile point and one small quartzite chip. These were found on the tip of a small point of land on the west side of the Dolores River, 40-60 feet above the river above a small island indicated on the map.

Joe Davis Hill Quad. T.42N, R.18W, NW¼ of the NW¼, Section 2. Elevation 5800 feet.

June 24, 1975.

point	cy	1.7, 1.1, .20 Barbs missing. Basally to corner-notched with expanding base nearly as large as the blade. Small step fracture and shearing are present on the blade. Barbs were possibly long (i.e., notches deep); this may be similar to PI-PII points. Fig. 6e.

I.A. #8

One 6.0 cm. long quartzite flake found on a finger of land jutting out onto the flood Plain of the Dolores River. Located on the west side of the river opposite Joe Davis Hill, 80 feet above the river.

Joe Davis Hill Quad. T.43N, R.18W, NE¼ of the SW¼, Section 34. Elevation 5760 feet.

June 24, 1975.

I.A. #9

Single, secondary, fine-grained, gray quartzite flake with some possible dorsal retouch and use. Flake was found in a shallow, south-facing overhang overlooking a large low terrace. This was the only overhang in the series between 5SM44 and 5SM45B that was found to contain any cultural material.

Joe Davis Hill Quad. T.43N, R.18W, NW¼ of NW¼, Section 22. Elevation 5680 feet.
June 25, 1975.

I.A. #10
One light gray projectile point (lost) and six isolated flakes (three chert, two quartzite, one siltstone). Located on the south side of the Dolores River inside a bend on the points of low gravel terraces that are terminated by the river.
Joe Davis Hill Quad. T.43N, R.18W, SW¼ of the SE¼, Section 10. Elevation 5600 feet.
June 26, 1975.

MONTROSE COUNTY

I.A. #11
Five large river cobble flakes (one used; three quartzite, two siltstone), and a core/chopper found scattered along a gravel terrace on the south side of the Dolores River. The terrace sits on the east side of a large drainage that flows into the Dolores River.
Davis Mesa Quad. T.47N, R.18W, NW¼ of the NE¼, Section 2. Elevation 4960-5000 feet.
June 29, 1975.

core/chopper - qe	10.4, 7.6, 2.9 Large flake with a series of dorsal flake scars on one side and end. Some dorsal step fracture and rounding present.

I.A. #12
Five large flakes of river cobbles were found isolated on a high gravel terrace on the west bank of the Dolores River. The terrace is formed by a large point of land extending into a large bend in the river. The flakes are chert (one), quartzite (two), and siltstone (two); one of the latter shows dorsal use.
Davis Mesa Quad. T.48N, R.18W, SE¼ of the SE¼, Section 35. Elevation 4980 feet.
June 29, 1975.

I.A. #13

Seven flakes found scattered in two areas at the top edge of the low cliff above the east side of the Dolores and below (west of) Colorado 141. There are three large quartzite, three siltstone (one of which is very large), and one utilized chert (?) flake. There is an abundance of cobbles and natural flakes along the top of the cliff. Two of the flakes collected came from near an historic foundation (see Appendix D). Areas across the highway at the base of the Entrada cliffs look better for sites but were not checked.

Red Canyon Quad. T.48N, R.18W, NE¼ of NW¼ to SW¼ of NE¼, Section 14. Elevation 4820-4860 feet.

June 30, 1975.

I.A. #14

This was a three area I.A. with two flakes from two areas and three flakes from the third one. The three areas are located on the ends of gravel terraces approximately 80 feet above the river on the west side. All of the flakes were of river cobble origin; four are siltstone and three are quartzite; one is very large.

Red Canyon Quad. T.48N, R.18W, SW¼, Section 11. Elevation 4840-4860 feet.

June 30, 1975.

GRAND COUNTY, UTAH

I.A. #15

Point base and two quartzite flakes found widely separated on a very large, slightly sloping gravel terrace on the south side of the Dolores. One area of fractured light gray granular quartzite similar to the larger flake collected was observed, but the fracture appears mostly natural. A half-section marker for sections 32 and 35 is present on the terrace.

Coates Creek 15' Quad. T.23S, R.26E, SE¼ of SW¼, Section 32. Elevation 4520 feet.

July 5, 1975.

point	cy	2.7, 1.8, .41 Base. Probably side-notched with broad notches. Base is straight and expanding; basal thinning present. Fig. 12f.

I.A. #16
One isolated, fine-grained quartzite flake sitting on a high gravel terrace on the south side of the Dolores River and the west side of Fisher Creek in Cottonwood Canyon.
Polar Mesa Quad 15'. T.24S, R.25E, NE¼ of SW¼, Section 2. Elevation 4320 feet.
July 5, 1975.

I.A. #17
Three thick chert flakes, one siltstone flake, and four very large, dark quartzite cobble flakes, one of which has a chopping edge. The material was found widely scattered on some gravelly hills and benches on the north and east side of the Dolores, above a sharp bend to the north in the river. Much placer or other bulldozer disturbance is adjacent below the material area.
Coates Creek 15' Quad. T.23S, R.25E, NE¼ of SW¼, Section 21. Elevation 4360-4440 feet.
July 6, 1975.

I.A. #18
Four red chalcedony flakes and one large brown chalcedony core were found fairly high on the slope of a gravel terrace on the east side of the Dolores River. A large river cobble broken into ten pieces which all fit together was found also. No striking platforms or any man-made fractures could be found.
Coates Creek 15' Quad. T.23S, R.24E, SE¼ of SE¼, Section 12. Elevation 4300-4340 feet.
July 7, 1975.

core	cy	10.1, 6.9, 6.7 Nodule with flake removals from two faces with a common edge. The edge shows some battering either from use or attempted flake removals. Heavy patina may obscure some (earlier?) flake scars.

I.A. #19
Six chalcedony flakes (two red, two white, one purple, one gray) found widely dispersed on the ends of several adjacent ridge-shaped gravel terraces. Vegetation in the area is extremely sparse. All the terraces are within 150 m. of the south side of the Dolores.
Coates Creek 15' Quad. T.23N, R.24E, NE$\frac{1}{4}$ of NE$\frac{1}{4}$, Section 11 and NW$\frac{1}{4}$ of NW$\frac{1}{4}$, Section 12. Elevation 4200-4280 feet.
July 7, 1975.

I.A. #20
Two red chert flakes (one utilized) found on the slopes of a much disturbed, high gravel terrace opposite the entrance of Cowskin Canyon. Vegetation is restricted to very low grasses and shrubs; the area is very open (and hot). An abandoned house sits at the foot of the terrace slopes.
Coates Creek 15' Quad. T.23S, R.24E, NW$\frac{1}{4}$ of SE$\frac{1}{4}$, Section 10. Elevation 4360 feet.
July 7, 1975.

APPENDIX C

Partial Inventory of Artifacts from Paradox Valley

Because of the paucity of information regarding artifacts presented by the Woodburys (1932), because it was thought possible that their ceramic classifications were out of date, and because of the bearing of such information on the discussion of Dolores River archaeology, it was thought useful to re-examine the collections from the 1931 Paradox survey and testing. Unfortunately only a portion of the collection and none of the field records could be located at the Colorado State Historical Museum, Denver, where the collection is housed. More unfortunately, the missing items (as of January, 1975) include all the pottery specimens for which there are cards. Data on what was available for study is presented anyway, especially since no information regarding lithics from this project is available elsewhere. As might be expected from the interests apparent in their article, the Woodburys seem to have saved only recognizable stone tools and no debitage. With regard to the missing items tallied, it should be noted that all the stone tools recorded (see Fig. 14 and descriptions below) are listed on the catalogue cards as "arrowhead" so that this category is likely to contain tools other than projectile points.

Kellie Masterson is to be thanked for her donation of time and expertise in the study of the bone artifacts. The section on bone is entirely her work.

All artifacts were examined without the aid of a microscope.

PARADOX VALLEY INVENTORY

Items for which there are cards but which were not available for study:		Items examined:		Total:
"Arrowheads"	10	chipped stone	16	26
Ceramics			0	28
sherds	27			
pot handle	1			
"polishers"	4		0	4
manos	2		0	2
"charcoal"	1		0	1
stone pot lid	1		0	1
hammerstone	1		0	1
		stone (?) beads	3	3
		bone beads	155	155
		bone awls	13	13
		bone gaming pieces	4	4
		bison rib-beamer	1	1
		burnisher (?)	1	1
		flaker	1	1
Total:	47		194	241

A small collection of unmodified animal bone including a very large vertebra identified as bison was seen but no inventory or identifieation checks were made. Both the Woodburys (1932:10-11) and Leach and Lippold (1973:17) report sheep, rabbit and bison bone, Leach and Lippold also report three human burials.

C.H.S.
Catalogue No.

05066
biface/knife/preform - qe (light gray)
4.2, 2.3, .8 Roughly triangular one corner is 95°, one 72°. Irregularly bifacially flaked; some possible wear. Fig. 14a.

57050
(37050?)
point/knife - qe (fine, light gray)
2.5, 1.7, .35 Tip, oblique break. One face has much bulbar surface, opposite is fairly regular with varying flake scars. Probable use especially one edge; use is mostly unifacial.

05078
point/knife - ct (Mottled gray)
2.1, 1.6, .32 Tip, oblique break. Small, regular oblique parallel flaking both faces--overall result is symmetrical. Light wear is apparent on both faces (use longitudinal to edge).

05031
drill - qe (fine, light gray)
3.1, 1.7, .47 Triangular with convex base; sides are concave coming to long narrow point. Somewhat irregular bifacial thinning, some polish at tip. Fig. 14b.

05055
graver - ct (yellow-"jasper")
2.2, .9, .26 (.32 thick at tip) Tiny flake scars on all of both faces. One face is slightly convex, the opposite markedly convex.

Sharp tip has been formed by many steep, small, regular flakes removed from the highly convex face. The flake scars meet to form a ridge. Tip has very small shearing and step fracture with polish. Sides are also much polished with minute shearing. Edge angle on both sides of tip is 70-72°. Fig. 14c.

05092
point - ct (brown and tan)
2.2, 1.1, .25 Tip missing, oblique break. Side-notched (.63 cm wide at notches) with straight base. Complete bifacial working with small, regular flakes removed. One side is worn with small, mostly unifacial shearing. Fig. 14d.

05054
point - cy (transparent white)
2.1, 1.3, .37 Base missing. Short sharp tangs from possibly basal but probably corner notching. Completely bifacially worked with convex, symmetrical faces. Shearing or crushing present on both edges and apparent mostly on the same face. Fig. 14e.

05034
point/drill? - qe (fine light gray)
1.95, 1.25, .42 Complete; side-notched with convex base. Bifacially completely flaked with some irregularities not removed. Some small step fracture on both sides, but on opposite faces. Tip is narrowed and shows some polish as from drill use. Fig. 14f.

05061

point - qe (fine gray)

1.7, 1.2, .33 Base, one tang, and the tip missing. Basally notched, creating long tangs at the corners. Completely bifacially retouched; slightly serrated. Mostly unused with possible minor wear in one area. .44 cm wide at the notches. Fig. 14g.

05062

point - qe (fine gray-brown)

1.9, 1.6, .35 Tip, base, one barb missing. Basally notched with very small, probably sharp base and very long barbs (.6 cm long). Small serrations; little wear apparent. Similar in size and form to 05061. .56 cm wide at the notches. Fig. 14h.

05033

point - cy (gray and brown)

1.7, .9, .23 Tip and base missing. Both are horizontal breaks. Probably corner-notched, with short, sharp tangs. Both edges show small shearing, one more than the other. .70 cm wide at the notches. Similar to 05054. Fig. 14i.

05063

point - cy (clear white)

1.8, 1.4, .25 Base and tangs missing. Probably corner to basally notched with long tangs. Complete bifacial work, mostly regular. Tip appears to have been broken and reworked. Fig. 14j.

05055

point - cy (pink and white)

1.9, 1.6, 158 Complete. Corner to basally notched with long tangs and expanding straight base. Completely bifacially worked but quite thick at approximate center. Slightly serrated and possibly slightly used; possible drill use at tip. .51 cm side at notches. Fig. 14k.

05036
point - cy (white)
1.65, 1.2, .22 Tip and small portions of barbs and base missing. Side-notched (.79 wide at notches) with straight base. Sides are slightly concave. One face with very fine retouch, opposite mostly unretouched except at edges. Some very small bifacial shearing. Material is very lustrous, may have been heat treated. Fig. 14l.

05060
point - ct (dark gray)
2.0, 1.3, .28 Tip, tangs, and part of base missing. Probably basally notched with long tangs and very small base. Completely bifacially worked with variable flake scars. Slightly serrated with possible small shearing. .45 cm wide at the notches. Fig. 14m.

05056
point - cy (clear gray)
2.55, 1.9, .34 Complete or possibly one tang missing. There is a single notch in the base which forms one tang and a fracture at the other corner; there does not appear to have been a second notch. One edge has unifacial very fine shearing, the opposite bifacial. Fig. 14n.

Bone Artifacts

by Kellie Masterson

bone beads - cat. no. 05091
155 fragments - none whole

short, cylindrical beads (see Kidder 1932 for definition of beads) well made and well worn

All were cut from a hollow, tubular shaft by transverse sawing; some also appear to have been shaped at the cut by whittling. This was probably done to make the sawing easier. The consistency of manufacture suggests that the beads were all made by the same person. Once the beads were detached the ends were ground flat and most of the edges slightly rounded or beveled. The beads have been well worn. They are highly polished on the interior as well as the exterior. In addition, the edges of the holes have been rounded from suspension. All but two of the beads are plain. Of the two that are incised, one has three incised grooves at each end and the other has one groove slightly offset from the middle. I don't know what type of bone was used for the beads. It was fairly thick-walled, with a high degree of curvature and a lack of internal supports. It resembles large turkey bones.

To possibly help with the identification of the bones utilized I made some measurements on a "randomly" selected sample of beads.

No.	Length	Width (of beadwall)	Diameter
1	2.0 cm	.25 cm	1.15cm
2	1.4	.15	1.16
3	1.8	.25	1.10
4	1.5	.20	1.0-1.25
5	2.0	.25	0.7-1.1
6	2.95	.20	0.7
7	1.2	.15	0.95
8	1.6	.30	1.1-1.2
9	1.85	.30	0.8-1.25
10	1.05	.23	0.95-1.20
11	2.3	.20	0.8
12	2.0	.20	0.7-1.0

bison (?) rib beamer - cat. no. 06000
right rib--ends missing--removed during excavation.

Unmodified except for wear. Wear consists of rounding and polish on the posterior edge. There is also the development of a slight bumpiness on the used edge typical of advanced wear on beamers. No measurements taken.

gaming piece - cat. no. 05026
A typical Southwestern artifact. A tabular bone fragment, trapezoidal semi-rectangular in shape, well finished.

Edges well ground and smoothed as are faces. Moderate polish. Both sides plain--no engraving. 2.8 cm x 1.1 x 0.15 (Figured by the Woodburys 1932:12).

game piece - cat. no. 05027
A tabular bone fragment, semi-rectangular in shape, well finished.

Edges well ground and smoothed as are both faces. One side is plain, the other is covered over the entire surface with parallel striations perpendicular to the length. 2.0 cm x 0.75 x 0.15 (Figured by the Woodburys 1932:12).

gaming piece (?) - cat. no. 05028
This does not fit the definition of the typical Southwest gaming piece. It is a small rectangular piece of solid bone.

Shaped initially by cutting then ground over all surfaces. Ends rounded, faces smooth. Well polished over entire surface so it must have been used.
3.98 x 1.35-1.45 x 0.95 cm.

gaming piece (?) - cat. no. 05029
Another abberant piece. Resembles somewhat cat. no. 05028. It is a small cylindrical shaft of solid bone.

Shaped by grinding. Sides relatively smooth, both ends rounded. Diameter fairly consistent along length of shaft, varies by only 1 mm. Polished.
4.75 x 0.8-0.9 cm.

antler flaker - cat. no. 05030
Short segment of antler, chopped off and partially whittled just below end of tine.

Base (where chopped off) not modified. Tip has several short step fractures from pressure flaking. One of these attempts at flake removal resulted in a chip being taken out of the flaker. This was remedied by partially grinding down the scar. Immediately opposite, on the other side of the tip is a polished area; possibly this is from finger pressure while flaking. 7.0 x 2.3 x 1.6 cm. Called horn point in catalogue.

burnisher (?) called bone point in catalogue - cat. no. 05023
A splinter of a metapodial, head completely removed.

Handle end rounded. Tip resembles screw driver, both faces flat and broad. Only one face used. No use striations, just polish extending back about 1 cm from edge. Flat end of tip slightly rounded. No measurements taken.

TABLE 9

Bone Awls (called bone points in catalogue)

Note: No measurements taken; definitions follow table.

Tip Out-line	Cat. No.	Modifi-cation	Point	Wear	Com-plete-ness	Re-sharp-ening	Comments
a	05011	S2	B	P	W	x	Tip is very rounded and polished. Rest of shaft also highly polished.
b	05012	S2	B	P	W	x	Tip is very rounded and polished. Rest of shaft also highly polished.
c	05013	S3	A	P	W	x	Tip is very rounded and polished. Rest of shaft also highly polished.
d*	05014	S2	A	P	W	x	Polish limited to tip. Shaft and haft not well polished.
e	05015	S--	B	P	F	x	Polish limited to tip.
f*	05016	W1	B	P	W	x	Tip extremely worn, very well rounded and polished. Shaft well polished.

TABLE 9 (Continued)

Tip Outline	Cat. No.	Modification	Point	Wear	Completeness	Resharpening	Comments
g*	05017	s--	B	P	F	x	Polish limited to tip. Shaft well finished, highly polished.
h*	05018	S2	E	P	W	x	Polish extends 2 cm up tip. Shaft well polished.
i	05019	s3	B	P	W	x	Tip well polished. Haft probably used as burnisher.
j	05020	S2	D	P	W	x	Tip well rounded and polished. Shaft polished.
k	05021	s2	B	P	W	x	Polish limited to tip Very little shaft polish.
l	05022	s2	B	P	W	x	Polish limited to extreme point of tip. Little shaft polish.
m	05024	s3	D	P	W	x	Shouldered tip, well rounded and ground. Shaft polished.

TABLE 9 (Continued)

Bone Awl Definitions:

Modification: W - whole; S - split; s - splinter; 1 - haft unmodified; 2 - haft partially modified; 3 - haft completely modified (from Kidder 1932)

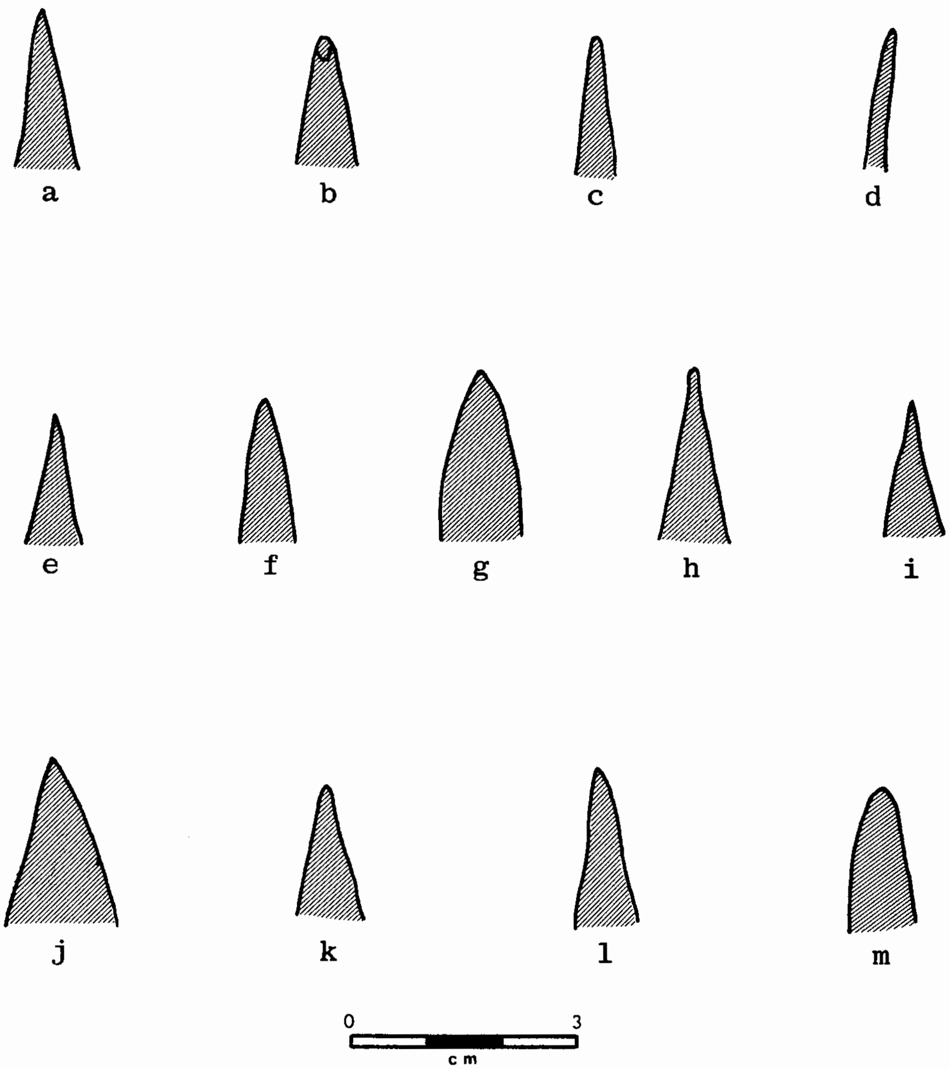
Point - point shape (from Morris and Burgh 1954): A - long, very slender, needle-like; B - long, uniformly tapered; C - blunt with flat point; D - blunt with rounded point; E - long, slender, concave sides.

Wear: S - striations; P - polish

Completeness: W - whole; F - fragment

Resharpening: presence/absence

*Figured in the Woodburys 1932:10.



Tip outlines of the bone awls from the Woodburys' (1932) test in Paradox Valley; keyed and described in the immediately preceding table.

APPENDIX D

Partial Listing of

Potential Historic Sites and Locations

T.39N, R.16W, Section 28, NE¼ of SW¼ (Trimble Point 7.5')

Abandoned house; there are a number of other disused farming and ranching structures and remains in the general vicinity.

T.42N, R.18W, Section 1, SE¼ of SW¼ (Joe Davis Hill 7.5')

Small stone structure about 1.5 m high built incorporating a juniper, on the north side of the river. Possibly a wind break or possibly part of a more substantial shelter.

T.42N, R.18W, Section 12, NE¼ of NW¼

Fairly recently abandoned tar paper shack.

T.43N, R.18W, Section 23, SW¼ of NW¼ (Joe Davis Hill 7.5')

South of 5SM41. Fireplace and chimney around 2 m in height--more elaborate than would be expected for an overnight camp; some historic material present in the vicinity and at 5SM41.

T.43N, R.18W

5SM45 and 47 both have historic elements.

T.43N, R.18W, Section 3, NW¼ of NW¼ (Hamm Canyon 7.5')

Hewn log cabin and associated out buildings at mouth of Nicholas Wash.

T.47N, R.18W, Section 31, SE¼ of NW¼ (Paradox 7.5')

Thick stone wall tied into several large boulders at the east end of an open terrace just north of the road; fence in bad repair also in association.

T.47N, R.18W, Section 3 (?) to T.48N, R.17W, Section 29 (Davis Mesa and Red Canyon 7.5')

Much bent and bowed surface pipe parallels the Dolores and turns up the San Miguel; unknown use.

T.48N, R.17W, Section 29 (or 28?) to T.48N, R.18W, Section 14 (+?) (Red Canyon 7.5').

The Hanging Flume and associated ditches. This is by far the most spectacular and famous of the historic sites on the Dolores. It begins on the San Miguel and runs to the Lone Tree Placer which was probably at the mouth of Mesa Creek. Construction of the flume took place in the 1890's and several vestiges of the building process are still evident such as the camp at 5MN436 and roads and beams placed for lowering men or materials at the San Miguel-Dolores confluence. It is strongly recommended that this structure be placed on the National Register of Historic and Archaeological Sites.*

T.48N, R.17W, Section 14, SW¼ of NE¼

Foundations of small house with considerable trash sitting near the top of the short cliff that drops to the river. Probably in the same ¼-¼ section but not associated is a conical rock structure, probably a charcoal kiln.*

T.49N, R.18W, Section 8, NW¼ of NE¼ (Juanita Arch 7.5')

Homestead at the mouth of Blue Creek.

T.50N, R.18W, Sections 31, 30, 29 + ? (Juanita Arch 7.5')

Constructed trail up Maverick Canyon going at least to Juanita Arch.

T.50N, R.18W, Section 30, SE¼ of SW¼

Log cabin.

T.50N, R.19W, Section 24 (?) (Juanita Arch 7.5')

Root cellar (?) excavated underneath large boulder, west of river and highway, with structures around 200 m. to north; location very approximate.

T.50N, R.19W, Section 13, SW¼ of NE¼

Abandoned structures on the west side of the river, east of Highway 141.

T.50N, R.19W, Sections 12, 2, 1 (Juanita Arch and Gateway 7.5')

Washed out ditch on east side of river.

T.24S, R.26E, Section 7, NE¼ of NE¼ (Polar Mesa 15')

Unoccupied (occasionally used?) homestead at the mouth of Beaver Creek.

T.23S, R.24E, Section 13, NE¼ of SE¼ (Coates Creek 15')

Water wheel, ladder, other items on the east bank of the river, across from the Shura Ranch.

T.23S, R.24E, Section 10, SW¼ of SE¼

Abandoned house.

*Recommended for inclusion on the National Register in the BOR-NFS draft environmental statement for the Dolores.

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